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Stimulants, Psychoactive Plants, and Human Optimization: Medical Gatekeeping, Prohibition, and Adult Autonomy in Drug Policy

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Abstract

Human societies have long used stimulant plants, psychoactive preparations, prescription medicines, commercial products, and traditional botanical substances to support wakefulness, endurance, labor, ritual, social participation, attention, motivation, fatigue resistance, performance, and human optimization. Modern drug policy regulates this field unevenly. Coffee, tea, caffeine, nicotine, energy drinks, pre-workout products, prescription stimulants, wakefulness-promoting agents, peptide-based nootropics, cognitive enhancers, and neurofunctional medicines are normalized through culture, commerce, medicine, taxation, research, or institutional use. Other forms of adult self-directed activation and optimization, especially those involving non-sanctioned psychoactive plants, fungi, compounds, or personal use outside approved medical and commercial channels, are often stigmatized, restricted, or criminalized.

This paper examines the regulatory paradox of stimulants, psychoactive plants, and human optimization. It argues that drug policy is shaped not only by pharmacological risk, but also by cultural familiarity, medical gatekeeping, market authorization, colonial history, religious-moral inheritance, social ritual, fiscal integration, workplace pressure, and state utility. Risk is not the dividing line between legality and criminality. Caffeine, nicotine, energy drinks, prescription stimulants, cognitive enhancers, alcohol, sugar consumption, extreme work, high-risk sport, and other accepted practices all carry risks under certain conditions. The central question is why some risks are normalized, commercialized, taxed, medicalized, researched, or operationalized, while others are treated as illegitimate or criminal.

The paper distinguishes pharmacological stimulants from the broader category of activation and optimization agents. It introduces self-directed activation and optimization as a regulatory concept for adult efforts to alter energy, attention, motivation, endurance, emotional state, social capacity, cognitive performance, and functional capacity. Dependence potential, cardiovascular risk, psychiatric vulnerability, dose, route, unsafe combinations, youth vulnerability, and coercive optimization pressure may justify information, labeling, quality control, truthful disclosure, civil responsibility, medical access, and targeted restrictions where concrete harm is present. Criminal prohibition requires a separate and stronger justification grounded in concrete harm, coercion, deception, youth targeting, direct third-party risk, unsafe commercialization, or the demonstrated failure of less restrictive alternatives.

The paper proposes a Liberty, Harm, and Intervention Threshold Test for evaluating stimulant substances, psychoactive plants, prescription stimulants, commercial performance products, peptide-based nootropics, cognitive enhancers, neurofunctional medicines, and non-classical activation agents. The model assesses mechanism, dose, route, preparation, supply safety, developmental risk, third-party harm, interaction

burden, social coercion, cultural bias, medical double standards, jurisdictional inconsistency, market authorization, and proportionality. It concludes that coherent drug policy should move beyond moralized prohibition toward a liberty-preserving model that distinguishes concrete harm, coercive optimization pressure, unsafe markets, and adult self-risk.

Keywords: stimulants, psychoactive plants, human optimization, self-directed activation, adult autonomy, drug policy, prohibition, medical gatekeeping, risk literacy, harm reduction, caffeine, coca leaf, khat, methylphenidate, modafinil, nootropics, Semax, Selank, Cerebrolysin, centrophenoxine, cognitive enhancers, energy drinks, nicotine, performance enhancement, psychoactive regulation

1. Introduction: The Regulatory Paradox of Human Optimization

Modern societies demand optimization. They reward wakefulness, consistent effort, speed, stamina, emotional control, focus, productivity, academic performance, athletic output, military readiness, and the capacity to work beyond ordinary fatigue. This demand is visible in legal consumer markets for energy drinks and performance products, in prescription stimulant medicine, and in operational fatigue-management contexts such as aviation and military performance [1-3].

Modern societies do not reject stimulation or optimization. They approve it when it appears as coffee, tea, caffeine, nicotine, energy drinks, prescription stimulants, wakefulness-promoting agents, cognitive enhancers, military fatigue management, or commercial performance products. They become suspicious when similar motives are pursued through informal, traditional, self-cultivated, Indigenous, non-medical, secular, or non-commercial channels. The question is therefore not whether societies accept psychoactive optimization. They clearly do. The question is which forms are normalized, medicalized, commercialized, taxed, researched, ritualized, militarized, culturally exempted, tolerated, prescription-only, over-the-counter, or criminalized.

The argument of this paper begins from a simple premise: adult activation and optimization are not inherently illegitimate. The wish to become more awake, focused, resilient, socially capable, motivated, enduring, cognitively effective, or functionally capable is a normal feature of human agency. A legal system may address concrete harms, unsafe markets, youth exposure, coercion, deception, and harm to others. It should not treat the adult pursuit of psychoactive self-optimization as a default object of suspicion merely because it occurs outside medical, commercial, fiscal, religious, or culturally familiar channels.

Risk is universal; criminalization is selective. If risk alone were sufficient, caffeine, nicotine, alcohol, sugar consumption, extreme sports, sleep deprivation, overwork, off-label enhancement, dietary supplements, and many accepted medical or commercial practices would require criminal treatment. Modern law does not operate that way. It tolerates risk where the practice is familiar, taxable, medicalized, profitable, ritualized, culturally protected, researched, or institutionally useful, while often criminalizing risk when it is culturally unfamiliar, secularly self-directed, traditional without recognition, or outside approved markets.

The central legal question is whether criminal prohibition is justified when the primary risk is borne by an adult and when less restrictive tools can address concrete risk concerns more effectively. This question is grounded in the distinction between self-regarding risk and harm to others [4,5]. It must also consider whether prohibition reduces total harm or creates additional risks by pushing demand into illegal markets, uncertain dosing, adulteration, contaminated supply, fear of seeking medical help, and criminal distribution networks [6-8].

2. Scope and Methodology

This paper is a conceptual and regulatory analysis of stimulant use, psychoactive plants, cognitive enhancers, modern nootropics, and human optimization in drug policy. It does not present a pharmacological meta-analysis, clinical trial review, ethnographic field study, or jurisdiction-specific legal doctrine. Its aim is to identify a structural inconsistency: modern societies normalize, commercialize, medicalize, ritualize, culturally exempt, militarize, research, and operationalize some forms of stimulation while stigmatizing or criminalizing others.

The method is interdisciplinary and comparative. Pharmacological literature is used to distinguish mechanisms, toxicity, dose-response patterns, dependence potential, and interaction burden. Ethnobotanical and historical sources contextualize stimulant plants and traditional psychoactive practices. Drug-policy literature is used to evaluate prohibition, illegal markets, unsafe supply, and harm-reduction alternatives. Legal-theoretical sources support the analysis of adult autonomy, self-regarding risk, concrete harm, and proportionality.

The paper compares regulatory logics rather than treating substances as equivalent. Coffee, caffeine, nicotine, coca leaf, khat, methylphenidate, modafinil, energy drinks, kratom, iboga, peptide-based nootropics, cholinergic cognitive enhancers, Parkinson's-related medicines, and other activation-related agents differ in mechanism and risk. They are examined because they reveal how law distinguishes culture, medicine, commerce, ritual, optimization, illegitimacy, and crime.

The central question is not the mere existence of risk, since risk exists across legal and illegal activation practices. The central question is why some risks are normalized, medicalized, commercialized, taxed, ritualized, culturally protected, researched, tolerated, or operationalized, while others are criminalized. Risk should be classified, contextualized, communicated, and addressed proportionately. Criminal prohibition should require stronger justification than cultural unfamiliarity, moral discomfort, medical gatekeeping, market exclusion, jurisdictional habit, or lack of state-recognized ritual status.

3. Core Concepts and Conceptual Boundaries

3.1 Pharmacological Stimulants

In the strict pharmacological sense, stimulants are substances that increase central or peripheral activation through mechanisms such as catecholaminergic activity, increased dopaminergic or noradrenergic signaling, adenosine receptor antagonism, cholinergic stimulation, or sympathomimetic effects. Examples include caffeine, nicotine, cathinone, ephedrine, cocaine, amphetamine-type stimulants, methylphenidate, and modafinil-like wakefulness-promoting agents.

This paper does not claim that all substances discussed here are pharmacological stimulants. That distinction is essential. Amanita muscaria, Peganum harmala, Sceletium, psilocybin mushrooms, mescaline-containing cacti, iboga, kratom, yohimbe, peptide-based nootropics, cholinergic cognitive enhancers, and various tonics or adaptogens differ substantially in mechanism, toxicity, dose-response profile, and risk. They are included only where they illuminate the broader field of human activation and optimization.

3.2 Activation and Optimization Agents

Activation and optimization agents are broader functional categories. They include substances, plants, fungi, products, medicines, peptides, neurotrophic mixtures, cognitive enhancers, or practices used to support wakefulness, task initiation, effort tolerance, social energy, emotional modulation, fatigue resistance, endurance, performance, resilience, cognitive function, or perceived self-optimization.

This broader category is not pharmacological equivalence. It is a regulatory comparison category. The substances discussed here differ substantially in mechanism, toxicity, dependence potential, withdrawal profile, dose-response structure, route sensitivity, interaction burden, and behavioral risk. Their inclusion does not imply equivalence between methylphenidate, caffeine, Amanita muscaria, Peganum harmala, Selank, Semax, or cholinergic medicines. The common object of analysis is not pharmacological sameness, but institutional classification: how legal systems normalize, medicalize, commercialize, tolerate, restrict, or criminalize adult attempts to modify wakefulness, cognition, fatigue, motivation, endurance, mood, or functional performance.

3.3 Self-Directed Activation and Optimization

Self-directed activation and optimization refers to adult use of psychoactive, stimulant, behavioral, physiological, neurocognitive, or performance-supporting methods to alter energy, attention, motivation, endurance, social capacity, emotional state, cognitive performance, or functional capacity.

Adult agency is the legal baseline, not a privilege earned through demonstrated pharmacological literacy. Modern societies do not require consumers to prove expert knowledge before buying coffee, energy drinks, alcohol, tobacco, sugar, dietary supplements, or high-risk sports equipment, even though these choices can produce serious harm under certain conditions. Risk literacy improves autonomy, but the absence of certified expertise does not eliminate adult sovereignty. The relevant legal duty is therefore not prior authorization of adult competence, but the prevention of deception, contamination, false labeling, coercion, youth targeting, and direct harm to others.

The concept identifies the correct starting point for legal analysis: adult self-use should be evaluated by evidence, context, and concrete harm, not by moral suspicion or institutional permission. It includes subtle forms of effort modulation, task initiation, and functional activation that may occur below overt intoxication or clinically dramatic behavioral change [9].

Human optimization is used here in a functional and anthropological sense. It does not mean perfectionism, transhumanist ideology, or compulsory enhancement. It refers to voluntary efforts to improve wakefulness, endurance, motivation, emotional regulation, social capacity, resilience, task execution, cognition, and performance under demanding conditions. It does not imply pharmacological equivalence, compulsory enhancement, or a claim that all optimization practices should receive the same legal treatment.

3.4 Domesticated Stimulation and Normalized Risk

Domesticated stimulation refers to stimulant use that has been made socially acceptable through ritual, habit, consumer branding, medical prescription, occupational necessity, taxation, cultural protection, research legitimacy, or state-sanctioned performance contexts.

Coffee, tea, matcha, yerba mate, cola drinks, energy drinks, pre-workout products, caffeine tablets, nicotine products, nootropic beverages, and some cognitive-enhancement products are examples of stimulation or activation that has been culturally, commercially, medically, or fiscally normalized. Caffeine-related dependence and withdrawal are discussed in clinical literature, but caffeine remains socially embedded rather than criminalized [10].

Risk normalization refers to the process by which a psychoactive risk becomes socially acceptable through ritual, commerce, medicine, taxation, occupational usefulness, cultural familiarity, protected tradition, or research framing. Risk criminalization refers to the process by which a psychoactive risk becomes treated as punishable or illegitimate because it occurs outside approved cultural, medical, commercial, religious, or state channels.

3.5 Botanical Psychoactive Autonomy

Botanical psychoactive autonomy refers to adult sovereignty concerning the cultivation, possession, preparation, and personal use of naturally occurring psychoactive plants, fungi, or preparations. This is not a claim of pharmacological privilege. Natural occurrence does not make a substance safer, weaker, or more legitimate than a synthetic molecule. Toxicity, potency, dependence potential, and physiological risk depend on mechanism, dose, route, preparation, concentration, and individual vulnerability, not on whether a molecule appears in a plant matrix or laboratory synthesis.

The legal relevance of botanical status lies elsewhere. Prohibiting adult cultivation, possession, preparation, or personal use of a naturally occurring organism regulates more than a compound. It also restricts private cultivation, traditional practice, self-directed experimentation, and personal control over naturally available biological materials. The burden of justification arises from the breadth of this intrusion, not from a belief that nature is inherently safe. Botanical autonomy therefore requires concrete justification for restriction; it does not create pharmacological immunity.

3.6 Cultural Exemption and the Equality Problem of Autonomy

Cultural exemption refers to legal or practical tolerance granted to psychoactive use because it is connected to recognized religious, Indigenous, traditional, or ritual identity. Such protection may be justified where it responds to colonial suppression, cultural erasure, or religious discrimination. The equality problem arises when psychoactive agency is recognized only for culturally or religiously approved subjects, while ordinary secular adults are treated as presumptively incompetent in comparable self-regarding contexts.

The point is not to weaken Indigenous or religious protections. The point is to expose the inconsistency of autonomy by exception. If psychoactive agency can be recognized in traditional or religious settings, then prohibition is not absolute. The remaining question is why adult autonomy should depend on state-recognized identity rather than adult agency, concrete harm, responsibility, and proportionality.

4. Stimulants as Technologies of Motivation, Labor, Ritual, and Social Life

Human beings have repeatedly used plants, psychoactive preparations, and compounds to alter fatigue, attention, energy, hunger, mood, sociability, endurance, and performance. This pattern appears across continents and historical periods. Stimulant use is therefore not a modern deviation, but a recurring feature of human culture [11,12].

Stimulants should not be reduced to intoxication or pharmacological enhancement. They also function as motivational technologies. Many individuals do not seek euphoria or escape, but the practical transition from intention to action: beginning work, resisting fatigue, sustaining effort, tolerating repetition, maintaining alertness, training physically, participating socially, or completing demanding tasks.

Stimulants have also functioned as social technologies. Coffeehouses supported conversation, trade, reading, and political culture [13]. Khat gatherings, tobacco ceremonies, cacao drinking, coca chewing, tea practices, mate circles, and kola exchange show that stimulant use is often communal rather than merely private. Such practices can structure conversation, hospitality, ritual, trade, study, work rhythms, endurance, and belonging.

The social meaning of a stimulant is shaped not only by pharmacology, but also by language, ritual, and cultural familiarity. The phrase "let us meet for coffee" is an ordinary social invitation. Pharmacologically, it also means: let us meet to consume a psychoactive stimulant together. Coffee shops operate openly as socially respected businesses, although their primary commercial product is a stimulant. This translation

sounds strange only because coffee has been culturally domesticated. Its risks are not absent; they are culturally managed.

The contrast becomes visible when the same sentence is applied to non-domesticated stimulants. "Let us meet for methamphetamine," "let us meet for khat," or "let us meet for coca" immediately sounds dangerous, immoral, or criminal in many modern contexts. This does not mean that coffee, khat, coca, and methamphetamine are pharmacologically equivalent. They are not. It means that social naming helps determine whether stimulant use appears as culture, medicine, vice, crime, pathology, or protected tradition.

This linguistic asymmetry is central to stimulant regulation. A substance may be socially invisible as a drug when embedded in familiar rituals, while another may remain morally marked even when the underlying human motive is similar: to become alert, socially available, energized, focused, or capable of sustained activity.

A coherent analysis must avoid treating all stimulants as one moral category. Coca leaf is not purified cocaine. Khat chewing is not equivalent to synthetic cathinone exposure. Coffee is not caffeine powder overdose. Ephedra tea is not high-dose ephedrine exposure. Rapé is not a nicotine pouch. Traditional kratom leaf use is not identical to concentrated extracts. Semax, Selank, Cerebrolysin, cholinesterase inhibitors, amantadine, selegiline, modafinil, and centrophenoxine are not one pharmacological class. These distinctions show why a coherent policy must classify substances and practices by mechanism, dose, route, interaction burden, context, and harm rather than by inherited stigma or cultural familiarity.

5. Human Optimization Beyond Classical Stimulants

The field of activation and optimization should not be limited to substances narrowly classified as psychostimulants. Human optimization practices include classical stimulants, dose-dependent plants, ritual tobacco preparations, respiratory stimulants, adrenergic agents, tonics, adaptogens, serotonergic subthreshold activation, psychoactive fungi, peptide-based nootropics, cholinergic cognitive enhancers, neurotrophic agents, dopaminergic or monoaminergic medicines, and mixed-mechanism botanicals.

For analytical clarity, this paper distinguishes five broad categories.

First, pharmacological stimulants include caffeine plants, coca leaf, khat, nicotine plants, betel or areca preparations, ephedra, amphetamine-type stimulants, methylphenidate, modafinil-like wakefulness agents, energy drinks, and pre-workout products [14,15].

Second, dose-dependent or mixed activation agents include iboga, kratom, yohimbe, lobelia, and some preparations that may shift between stimulation, sedation, intoxication, or toxicity depending on dose, route, preparation, and individual vulnerability [16-18].

Third, subthreshold or non-classical psychoactive activation includes Sceletium or kanna [19], low-dose psilocybin and low-intensity mescaline cactus use [20,21], and preparation-dependent Amanita muscaria or harmala-containing plants [22,23]. These are not classical stimulants, but they may produce activation, emotional modulation, cognitive flexibility, social openness, or motivational effects in some contexts.

Fourth, tonics and adaptogenic optimization agents include maca, ginseng, rhodiola, Eleutherococcus, Schisandra, cinchona-related tonic traditions, and other vitality-supporting botanicals. These are not stimulants in the narrow pharmacological sense, but they belong to the broader human history of vitality, endurance, resilience, and performance support [24].

Fifth, modern neurocognitive activation agents include peptide-based nootropics and neurotrophic peptide mixtures such as Semax, Selank, and Cerebrolysin [25-27], cholinergic cognitive enhancers and

Parkinson's-related medicines [28,29], and wakefulness-promoting or older nootropic compounds such as modafinil, selegiline, and meclofenoxate/centrophenoxine [30-32]. These agents are not classical stimulants as a group. Their relevance lies in the same regulatory pattern: modern medicine, research systems, and supplement markets already recognize pharmacological attempts to alter attention, fatigue, cognitive performance, arousal, motivation, and neurofunctional capacity.

This classification prevents two category errors: treating natural occurrence as a pharmacological safety guarantee, and treating non-sanctioned psychoactive activation as illegitimate or criminal by default. It also shows that human optimization is not limited to traditional plants or recreational markets. Modern peptides, nootropics, neurotrophic agents, cholinergic enhancers, dopaminergic medicines, and wakefulness-promoting drugs demonstrate that pharmacological activation is already accepted when routed through medical, research, commercial, or institutional channels.

6. Historical and Contemporary Activation Agents

A historically serious analysis of stimulant regulation must include more than coffee, cocaine, amphetamines, and energy drinks. Human activation practices include classical stimulants, dose-dependent psychoactive plants, ritual tobacco preparations, adrenergic botanicals, serotonergic subthreshold activation, tonics, adaptogens, modern synthetic or commercial stimulants, peptide-based nootropics, neurotrophic mixtures, cholinergic cognitive enhancers, and neurofunctional medicines.

The examples below are not presented as pharmacologically equivalent. Their purpose is to show the diversity of human activation practices and the inconsistency of modern regulatory categories. Table 1 summarizes the major examples and prevents the substance discussion from overwhelming the main argument.

Table 1. Historical and contemporary activation agents across cultural, pharmacological, and regulatory contexts.

Source or agent	Category	Principal active constituents or mechanism	Historical or social use	Modern regulatory pattern	Relevance to regulatory paradox
Energy drinks and pre-workouts	Commercial activation products	Caffeine, taurine, sugar/sweeteners, amino acids, botanical extracts	Study, gaming, sport, work, nightlife, performance	Legal consumer products with labeling concerns	Shows mass-market sale of activation and optimization [1]
Methy lphenidate	Prescription stimulant	Dopamine and norepinephrine reuptake inhibition	Medical treatment, attention and behavioral regulation	Prescription controlled medicine	Shows medical gatekeeping of stimulant legitimacy [2]

Source or agent	Category	Principal active constituents or mechanism	Historical or social use	Modern regulatory pattern	Relevance to regulatory paradox
Modafinil and wakefulness agents	Wakefulness-promoting medicine	Wakefulness-promoting pharmacological effects involving dopaminergic and arousal-related systems	Sleep disorders, shift work, operational vigilance	Prescription/controlled depending on jurisdiction	Shows institutional acceptance of fatigue management [3]
Coffee, tea, matcha, yerba mate, guarana, kola, guayusa, yaupon, yoco	Classical botanical stimulants	Caffeine and related methylxanthines	Wakefulness, hospitality, study, labor, conversation	Widely legal, commercialized, culturally normalized	Shows domesticated stimulation and social invisibility of caffeine as a drug [10,13]
Cacao	Mild methylxanthine-containing psychoactive food/drink	Theobromine, smaller amounts of caffeine	Ritual, elite beverage, social and energizing use	Legal food commodity	Shows transformation of psychoactive plant into ordinary consumer culture [11]
Areca/betel	Cholinergic stimulant-like practice	Arecoline	Social, ritual, digestive, stimulant-like chewing	Legal or culturally tolerated in many regions; health-risk regulation varies	Shows non-Western stimulant practices often remain under-theorized [11]
Coca wine and early Coca-Cola	Historical commercial stimulant products	Coca and kola associations historically	Fatigue, vitality, mood, commercial tonics	Reformulated/normalized consumer products	Shows historical transformation of stimulant desire into consumer culture [11,13]

Source or agent	Category	Principal active constituents or mechanism	Historical or social use	Modern regulatory pattern	Relevance to regulatory paradox
Ephedra	Adrenergic botanical stimulant	Ephedrine, pseudoephedrine	Traditional medicine, respiratory use, stimulation	Restricted in many supplement contexts	Shows plant-to-alkaloid-to-commercial-risk pathway [12]
Khat	Botanical stimulant	Cathinone, cathine	Chewing, sociability, work endurance, appetite suppression	Legal in some regions, prohibited in others	Shows migration, culture, and health framing in regulation [14,15]
Iboga/ibogaine	Dose-dependent psychoactive plant/alkaloid	Iboga alkaloids	Ritual, endurance/ fatigue contexts, anti-addiction interest	Restricted/controlled or medically researched	Shows activation, visionary use, and serious cardiac-risk overlap [16]
Kratom	Dose-dependent mixed plant	Mitragynine and related alkaloids	Labor, energy, pain relief, fatigue resistance	Variable legality; concern over extracts and dependence	Shows need to distinguish leaf, extract, dose, and product quality [17]
Yohimbe/ yohimbine	Adrenergic plant alkaloid	Yohimbine	Sexual performance, stimulation, supplement markets	Commercial supplement/medicine depending on context	Shows legal supplement risk and adrenergic toxicity [18]
Sceletium/ kanna	Psychoactive modulation	Mesembrine-type alkaloids	Mood, stress, social ease	Supplement/research contexts	Broader activation without classical stimulation [19]
Psilocybin mushrooms	Serotonergic psychoactive activation at low dose	Psilocybin/ psilocin; serotonin 2A receptor (5-HT2A) activity	Ritual, psychedelic, low-dose contemporary use	Mostly controlled, with medical reform in some jurisdictions	Shows subthreshold activation outside classical stimulant categories [20,21]

Source or agent	Category	Principal active constituents or mechanism	Historical or social use	Modern regulatory pattern	Relevance to regulatory paradox
Amanita muscaria	Pharmacologically mixed psychoactive fungus	Muscimol, ibotenic acid	Ritual/folk psychoactive use	Emerging commercial products, toxicology concern	Shows preparation-dependent and non-classical activation risk [22]
Peganum harmala	Monoamine oxidase-inhibiting psychoactive plant	Harmine, harmaline	Ritual, dye, medicine, admixture use	Variable legality; high interaction-risk relevance	Shows interaction-risk assessment rather than stimulant classification [23]
Maca, ginseng, rhodiola, Eleutherococcus, Schisandra	Tonics/ adaptogens	Multiple plant constituents	Vitality, fatigue resistance, resilience	Legal supplement markets	Shows broader vitality and performance tradition [24]
Semax, Selank, Cerebrolysin	Modern peptide-based or neurotrophic activation agents	Adrenocorticotropic hormone (ACTH)-fragment analogues, regulatory peptides, neuropeptide mixtures	Cognitive activation, fatigue modulation, neuroprotection, stress regulation, neurological recovery contexts	Medical/research use in some regions; supplement or gray-market interest elsewhere	Shows modern peptide-based optimization outside classical stimulant categories [25-27]
Donepezil, rivastigmine, galantamine, memantine, amantadine	Cognitive, cholinergic, glutamatergic, or dopaminergic medicines	Cholinesterase inhibition, glutamatergic modulation, dopaminergic mechanisms	Dementia, Parkinson's disease, cognitive symptoms, functional capacity	Prescription medicine and clinical use	Shows that medical systems already authorize pharmacological cognitive activation and neurofunctional intervention [28,29]

Source or agent	Category	Principal active constituents or mechanism	Historical or social use	Modern regulatory pattern	Relevance to regulatory paradox
Selegiline, modafinil, centrophenoxine/meclofenoxate	Monoaminergic, wakefulness-promoting, or nootropic agents	Monoamine oxidase B-related mechanisms, wakefulness promotion, cholinergic nootropic mechanisms	Fatigue, excessive daytime sleepiness, cognitive enhancement interest, supplement-market leakage	Prescription medicine, off-label use, supplement-market leakage, or unapproved enhancement products	Extends the regulatory paradox into fatigue, arousal, and cognitive-enhancement domains [30-32]
Coca leaf	Botanical stimulant and cultural plant	Coca alkaloids in leaf matrix	Andean chewing, coca tea, altitude/labor support, ritual	Internationally controlled despite traditional use disputes	Key plant-versus-alkaloid test case [33-35]
Tobacco, Rapé/Hapé, pituri	Nicotine-containing plant preparations	Nicotine and tobacco-related compounds	Ritual, social, medicinal, ceremonial, functional use	Tobacco legal/regulated; Indigenous preparations variably recognized	Shows dependence risk can coexist with legality and taxation [36]

Table 1 moves from familiar commercial and medical activation products to botanical, mixed-mechanism, peptide-based, cognitive-enhancement, cultural, and nicotine-containing examples, showing why the paper distinguishes pharmacological stimulation from the broader regulatory field of activation and optimization. Energy drinks, methylphenidate, modafinil, caffeine plants, khat, coca leaf, nicotine preparations, ephedra, and some Parkinson's-related dopaminergic or wakefulness-promoting agents are closer to the classical or clinical activation field. Kratom, iboga, yohimbe, Sceletium, Amanita muscaria, Peganum harmala, psilocybin mushrooms, mescaline-containing cacti, adaptogenic tonics, peptide-based nootropics, neurotrophic mixtures, cholinergic cognitive enhancers, and older nootropic compounds occupy more complex or peripheral positions. Their inclusion is not a claim of pharmacological equivalence. It is a claim of regulatory relevance: modern law must classify substances by mechanism, dose, route, preparation, interaction burden, social context, and harm rather than by inherited stigma, medical gatekeeping, cultural familiarity, or market authorization.

The strongest examples for the central paradox are coca leaf, khat, caffeine, nicotine, methylphenidate, modafinil, energy drinks, pre-workout products, peptide-based nootropics, cholinergic cognitive enhancers, Parkinson's-related activation medicines, and older nootropic compounds. These cases show how similar human motives - wakefulness, endurance, effort tolerance, social participation, task initiation, cognition, fatigue resistance, and optimization - receive sharply different legal and moral interpretations

depending on cultural familiarity, medical authorization, commercial packaging, research status, religious exemption, cultural status, or state utility.

7. Plant Matrix, Dose, Route, and Context: Why Substance Identity Is Not Enough

A coherent policy must distinguish botanical matrix, crude preparation, standardized extract, isolated alkaloid, synthetic derivative, peptide, neurotrophic mixture, pharmaceutical formulation, dose, route, speed of onset, frequency, purity, individual vulnerability, and social context.

Risk is not determined by substance identity alone. Coca leaf, coca tea, isolated cocaine, smoked cocaine, and injected cocaine do not share the same risk profile. Khat chewing, cathinone isolation, and synthetic cathinone products require separate analysis. Coffee, caffeine tablets, energy drinks, and caffeine powder are related but not identical. Rapé, cigarettes, vapes, nicotine pouches, and pituri all raise nicotine-related questions but differ in route, formulation, cultural meaning, and risk profile. Semax, Selank, Cerebrolysin, cholinesterase inhibitors, amantadine, selegiline, modafinil, and centrophenoxine/meclofenoxate likewise require mechanism-specific classification rather than general classification as stimulants.

This distinction is decisive. A risk-based policy cannot treat plant, extract, isolated alkaloid, synthetic derivative, peptide, nootropic compound, low-dose oral use, high-dose concentrated use, and rapid-onset routes as if they were the same legal and risk-assessment object.

8. From Moral Control to Drug Prohibition: Historical and Religious-Moral Inheritance

Modern psychoactive control did not emerge as a purely health-based system. It developed through overlapping processes of trade regulation, taxation, medical licensing, pharmacy control, colonial governance, religious moral reform, administrative expansion, and international treaty-making. Over time, these processes helped transform many psychoactive practices from matters of custom, ritual, medicine, or commerce into objects of criminal law.

The early twentieth century marked a major transformation in international drug control, including the 1912 International Opium Convention and later the 1961 Single Convention on Narcotic Drugs [33,37]. These systems did not merely classify substances pharmacologically. They created legal categories, administrative duties, enforcement mechanisms, and moral hierarchies around psychoactive plants and compounds [38,39].

Religious and moral authorities have also shaped how societies classify intoxication, bodily pleasure, altered states, ritual plants, and self-directed psychoactive practices. In some historical contexts, psychoactive use was framed not only as a health issue, but as a moral problem: temptation, impurity, sin, weakness, disorder, or deviation from an approved way of life. Such moral framing could support efforts to discipline conduct, replace older lifeways, impose ideals of sobriety or obedience, and define which forms of bodily or spiritual experience were legitimate [40].

This does not reduce religious history to repression. Many religious systems also used psychoactive substances ritually or developed practices involving fasting, vigilance, abstinence, incense, wine, tobacco, sacred drink, prayer, or altered states. The point is more precise: modern stimulant and drug policy inherited not only medical and legal categories, but also older moral categories. A coherent policy must distinguish concrete harm from inherited moral discomfort.

9. Colonial Classification and the Coca Leaf Test Case

Plant-based stimulants often entered modern drug control through colonial and ethnocentric categories.

The treatment of coca leaf, khat, betel, tobacco preparations, and other traditional plant stimulants shows how regulatory systems may fail to distinguish traditional use, plant matrix, isolated alkaloid, cultural meaning, and risk [34,39].

Coca leaf is the strongest test case. It is a naturally occurring plant, a traditional Andean stimulant, a symbol of Indigenous cultural practice, a source of mild functional activation in leaf form, and also the botanical source of isolated cocaine. These facts have often been collapsed into one legal category. A coherent model must separate coca leaf chewing, coca tea, standardized traditional preparations, isolated cocaine, concentrated products, and rapid-onset routes of administration.

The coca leaf exposes a central weakness of prohibitionist stimulant policy: it often regulates names, fears, and historical stigma rather than actual dose, route, preparation, risk, and social context. The recent international review process concerning coca leaf further shows that coca remains a live test case for the tension between inherited treaty categories, evidence, and Indigenous cultural claims [35].

The coca leaf case also raises a broader equality problem. If traditional, Indigenous, or religious contexts can justify differentiated access to psychoactive plants, then prohibition is not absolute. The remaining question is why adult psychoactive autonomy should depend on cultural status rather than adult agency, concrete harm, and proportionality.

10. Cultural Exceptions and the Equality Problem of Adult Autonomy

Cultural, Indigenous, or religious exemptions reveal an important inconsistency in psychoactive regulation. If a controlled substance can be used lawfully or with special protection within a recognized religious or Indigenous context, the absolute necessity of prohibition is already weakened. The exemption demonstrates that the central legal question is not whether the substance can ever be used, but who is permitted to use it, under which recognized identity, institution, ritual, or cultural category.

This argument does not oppose Indigenous or religious protections. Such protections may be justified responses to colonial suppression, cultural erasure, and religious discrimination. The point is different: cultural protection should not become autonomy by exception. If psychoactive agency is recognized only when attached to tradition, ancestry, religion, or institutional recognition, then modern law does not protect autonomy as such. It protects approved identities.

The United States Religious Freedom Restoration Act requires government to satisfy a compelling-interest and least-restrictive-means standard when substantially burdening religious exercise [41]. In Gonzales v. O Centro Espírita Beneficente União do Vegetal, the United States Supreme Court held that the federal government had not met that standard when seeking to prevent a religious group's sacramental use of hoasca containing a controlled substance [42]. The American Indian Religious Freedom Act Amendments of 1994 created statutory protection for traditional Native American religious use of peyote [43]. Internationally, the United Nations Declaration on the Rights of Indigenous Peoples recognizes rights relating to Indigenous cultural traditions, customs, spiritual traditions, and religious practices [44].

These examples do not show that cultural or religious protections are illegitimate. They show that blanket prohibition is not conceptually unavoidable. If law can recognize psychoactive agency in traditional, Indigenous, or religious settings, it must explain why secular adult agency is treated as presumptively less valid when the conduct is self-regarding and not shown to create concrete harm to others.

The equality problem is therefore central. Adult autonomy should not depend on whether psychoactive use is inherited, ritualized, medicalized, commercialized, or state-recognized. It should depend on adult agency, concrete harm, responsibility, and proportionality. A legal system that recognizes psychoactive

agency for culturally approved adults while denying it to secular or self-directed adults is not merely regulating pharmacological risk. It is distributing autonomy through cultural status. Such a system requires stronger justification than inherited stigma, administrative convenience, or moral discomfort.

11. Prohibition as Risk Production: Illegal Markets, Unsafe Supply, and Concrete Harm

Prohibition does not abolish demand. It changes the conditions under which demand is met. Some forms are domesticated through coffee, tea, matcha, energy drinks, pre-workout supplements, prescription stimulants, cognitive enhancers, occupational fatigue management, and cultural exemption, while others are displaced into illegal markets.

The failure of prohibition is not merely that it fails to eliminate demand. Its deeper failure is that it transfers demand from visible, assessable, and quality-controlled channels into illegal markets. Where prohibition displaces use into illegal markets, it may add risks of uncertain dosage, adulteration, contamination, violence, corruption, and barriers to treatment [6-8].

Criminalization can therefore transform a substance risk into a supply-chain risk. The adult actor faces not only the intrinsic risk of the substance, but also the additional risks created by illegality. If criminalization fails to suppress demand and instead produces illegal markets, unsafe supply, organized crime, corruption, violence, adulteration, contamination, uncertain dosage, and preventable deaths, then prohibition may create or intensify the harms it claims to prevent.

The cost question must therefore be framed comparatively. If demand persists, the relevant issue is whether criminalization reduces total preventable harm or whether it increases avoidable costs through adulteration, misdosing, contaminated supply, unknown potency, and delayed medical assistance.

The central question is not the mere presence of risk, because risk is present across many accepted legal, medical, commercial, occupational, cultural, and recreational practices. The question is whether criminalization reduces concrete harm better than non-criminal access, accurate information, quality control, age limits, labeling, medical screening, and responsibility-based consequences.

12. Commercialized Optimization and Social Performance Pressure

The contemporary market for energy drinks, pre-workout supplements, caffeine tablets, nicotine products, nootropic beverages, and cognitive-enhancement supplements shows that activation demand is not socially marginal. It is commercialized, advertised, normalized, and framed as productivity, fitness, focus, endurance, cognitive performance, lifestyle optimization, and performance enhancement [1,32].

The language of these products is explicit. "Energy drink" means drinkable activation. "Pre-workout booster" means substance-supported performance before exertion. "Focus drink," "fat burner," "nootropic stack," and "cognitive enhancement" show that modern consumers are invited to chemically support energy, attention, metabolism, cognition, and performance.

This market exposes the regulatory paradox. A caffeine-based drink marketed for energy, concentration, or athletic performance may be sold as an ordinary consumer product, while other stimulant plants, compounds, peptides, or nootropics may be treated as contraband even when the human motive is similar: to resist fatigue, initiate action, increase motivation, improve effort tolerance, sharpen attention, support cognition, or exceed ordinary performance limits.

The regulation of activation and optimization cannot be reduced to a conflict between an isolated individual and the state. Modern activation demand is socially produced. Competitive education, platform work, shift work, precarious employment, military readiness, high-performance workplaces, athletic

culture, digital productivity, and constant availability all increase the pressure to remain awake, focused, socially functional, and productive.

Social optimization pressure does not refute adult autonomy; it reveals why coercive environments matter. The danger is not that adults seek optimization. The danger is that institutions may convert optimization into an informal obligation. A coherent policy should therefore protect two liberties at once: the liberty of adults to engage in self-directed optimization, and the liberty not to be coerced by employers, schools, platforms, military structures, or competitive institutions into chemical performance.

The tension between the freedom to optimize and the freedom not to be pressured into optimization is structural. In competitive environments, effective enhancement can shift performance norms and create implicit compulsion. This problem is not solved by criminalizing adult self-directed use, because prohibition targets the individual rather than the system that produces competitive pressure. The relevant legal and sociological question is how workplaces, schools, military institutions, platform economies, athletic systems, and professional hierarchies convert voluntary enhancement into expected performance. The object of intervention is therefore coercive optimization pressure and discriminatory performance expectation, not adult self-directed activation as such.

13. Medical Gatekeeping and the Prescription Pathway to Legitimacy

Medicalization is one of the main pathways by which stimulants and cognitive enhancers become legitimate. A compound may be treated as dangerous, illicit, or criminal outside institutional authorization, while becoming therapeutic when prescribed under a diagnostic category.

Methylphenidate illustrates this instability. Its pharmacological identity as a central nervous system (CNS) stimulant is interpreted differently depending on diagnosis, prescription authority, monitoring, and legal context [2]. In attention-deficit/hyperactivity disorder (ADHD) practice, methylphenidate is framed as treatment; outside the medical channel, similar activation motives may lose legitimacy not because the motive changes, but because the institutional channel changes.

Diagnosis, screening, contraindications, dosing, monitoring, and physician oversight can reduce risk. The problem arises when medical gatekeeping becomes the only acceptable route for adult activation, while non-medical self-directed activation is treated as moral failure or criminal conduct.

Medicine should provide risk knowledge, not monopolize adult self-activation. Peptide-based nootropics and neurotrophic mixtures show this pattern in research and neurofunctional contexts [25-27]. Cholinergic dementia medicines and dopaminergic Parkinson's medicines show that medicine already recognizes pharmacological attempts to modify cognition and functional capacity [28,29]. Wakefulness-promoting drugs, monoamine oxidase B-related medicines, and older nootropic compounds extend the pattern into fatigue, arousal, and supplement-market domains [30-32]. The issue is therefore not whether pharmacological self-optimization is thinkable. It is who controls its legitimacy.

14. Military, Aviation, and Occupational Fatigue Management

Stimulants are also treated differently when they serve operational goals. In military, aviation, emergency medicine, night-shift labor, and high-demand occupational contexts, wakefulness-promoting agents and stimulant-like interventions may be justified as tools for fatigue management, alertness, and mission performance [3]. This institutional use confirms that modern societies already recognize the practical value of pharmacological wakefulness, fatigue management, and performance support when these serve approved objectives.

This produces a deep asymmetry. The adult citizen may be criminalized or pathologized for seeking self-directed activation, while similar pharmacological logic becomes acceptable when used for medical productivity, military readiness, aviation safety, or occupational performance. The target of prohibition is therefore not activation itself, but activation outside approved institutional channels.

15. Dependence, Poly-Substance Use, and Interaction Burden

Dependence potential is a regulatory factor, not a sufficient basis for criminal prohibition. Many accepted substances and behaviors involve habit formation, withdrawal, repeated use, or dependence-like patterns. Caffeine and nicotine show that modern societies do not criminalize dependence as such; they regulate, tolerate, tax, medicalize, commercialize, or culturally normalize it [10].

The relevant question is therefore not whether dependence can occur. The relevant questions are how severe it is, whether it creates concrete harm to others, whether product quality and accurate information reduce avoidable risk, and whether criminalization produces greater harm than proportionate non-criminal responses.

Interaction burden refers to cumulative risk created when multiple substances, medicines, supplements, peptides, nootropics, or behavioral stressors affect overlapping physiological systems, including cardiovascular function, sleep, monoamine signaling, anxiety, impulsivity, hepatic metabolism, thermoregulation, cholinergic signaling, glutamatergic modulation, or monoamine oxidase (MAO) activity.

Self-directed activation rarely occurs in a pharmacological vacuum. Individuals may combine caffeine, nicotine, alcohol, pre-workout products, prescription medicines, nootropics, peptides, herbal products, sleep aids, antidepressants, or non-sanctioned stimulants. This does not transform adult self-use into criminal conduct. It makes accurate information, product testing, interaction warnings, contraindication guidance, and emergency thresholds more important.

Stacking creates epistemic limits for any regulatory model. When multiple legal, medical, supplemental, and non-sanctioned agents are combined, interaction risks may become nonlinear and difficult to predict. This complexity does not make blanket prohibition more coherent. It shows that prohibition cannot function as a reliable knowledge system. The appropriate response is to improve visibility: open toxicological data, product testing, contraindication warnings, transparent labeling, adverse-event reporting, and medical access without fear of punishment. Unknown synergistic toxicity is a reason for epistemic humility, not for converting adult self-directed use into a criminal category.

Poly-substance risk therefore supports risk literacy and quality control. It does not support blanket prohibition. A policy that ignores interaction burden is structurally incomplete; a policy that uses interaction burden as a general justification for criminalization is disproportionate.

16. Medicine as Risk Knowledge, Not Psychoactive Gatekeeping

Medicine should function as a source of risk knowledge, not as a gatekeeping authority over adult self-directed activation. Medical systems can clarify dose, contraindications, cardiovascular risk, psychiatric vulnerability, sleep disruption, tolerance, dependence, drug interactions, unsafe combinations, and warning signs.

This informational function does not create authority over adult bodily autonomy. Physicians, pharmacists, toxicologists, and health institutions can provide risk literacy, screening, advice, and treatment access where needed. Their role is not to convert adult self-directed activation into either a diagnosis or a crime.

Youth protection and adult autonomy should be separated analytically: developmental vulnerability may justify stronger restrictions for minors, while adult risk requires a different legal standard [45].
Law should not guarantee that adults never make risky choices. It may preserve conditions for truthful information, prevent direct harm to others, protect minors and vulnerable groups, reduce unsafe supply, and assign responsibility when concrete harm occurs.

17. Political Economy: Taxation, Market Authorization, and Institutional Control

The political economy of activation is not limited to taxation. It also concerns market authorization. A substance becomes legitimate when it can be inserted into approved channels: consumer branding, pharmaceutical prescription, supplement markets, occupational protocols, military logistics, clinical research, cultural exemption, or taxable retail systems. A substance becomes illegitimate when it remains outside those channels, especially when it is informal, traditional without recognition, Indigenous without protection, home-cultivated, self-directed, secular, or difficult to standardize commercially.
Regulatory inconsistency is also visible across jurisdictions. Similar substances, formulations, or activation practices may be treated as over-the-counter products, prescription medicines, controlled substances, supplement ingredients, research compounds, tolerated materials, or prohibited substances depending on national scheduling, medical culture, administrative history, enforcement priorities, and market authorization. If regulation followed a purely pharmacological logic, comparable substances would be classified in broadly comparable ways across legal systems. Persistent variation between jurisdictions shows that psychoactive regulation is also shaped by institutional history, cultural status, commercial pathways, and administrative choice [46,47].
Some psychoactive commodities remain legally available not because they are harmless, but because they have been domesticated into taxable consumer markets. Tobacco, alcohol, caffeine products, energy drinks, nicotine products, nootropic products, and related consumer goods illustrate how psychoactive demand can become commercially and fiscally integrated.
The problem is not that the state taxes harmful substances. The problem is that legality, taxation, moral legitimacy, cultural recognition, research legitimacy, and punishment are distributed unevenly across psychoactive markets. Legal psychoactive markets become sources of revenue; illegal psychoactive markets become sources of punishment.
Stimulant and activation policy often regulates not only risk, but access, ownership, identity, and institutional control. The state, medicine, industry, and moral authorities do not merely decide which substances are dangerous. They also decide which forms of activation may become respectable, taxable, profitable, medical, spiritual, culturally protected, tolerated, prescription-only, over-the-counter, criminal, or invisible.

18. The Limits of State Competence over Adult Self-Optimization

The state may respond to concrete harm. It may punish violence, fraud, coercion, reckless public endangerment, unsafe commercial distribution, youth targeting, and deceptive marketing. It may require truthful labeling, age limits, quality control, and medical warnings. But it does not possess an unlimited mandate over adult energy, attention, motivation, endurance, cognition, pleasure, ritual, consciousness, or self-optimization.
The burden of justification lies with the authority that restricts liberty. Where adult conduct is primarily self-regarding, where no concrete harm to others is demonstrated, and where less restrictive tools are

available, criminal prohibition is not a neutral safety measure. It is an exercise of coercive power that requires strong justification [4,5].

Legal systems routinely permit adults to assume self-regarding risks without prior competence checks. Coffee, energy drinks, alcohol, tobacco, sugar, dietary supplements, extreme sports, and physically demanding labor can all produce serious harm under certain conditions. Their legality does not rest on proof that each adult fully understands the relevant physiology. It rests on the presumption that adults may make risky choices unless concrete harm to others, deception, coercion, youth targeting, or unsafe commercial conduct justifies intervention.

A legal order committed to freedom must treat adult self-risk as a domain of sovereignty, not as a default object of criminal suspicion. Freedom is not an exception granted after institutional approval; restriction is the exception that requires justification.

19. Adult Sovereignty, Responsibility, and Concrete Harm

The central task of activation policy is not to shield adults from self-regarding risk. It is to preserve adult choice, prevent concrete harm to others, and assign responsibility where conduct produces demonstrable injury, coercion, deception, negligence, or public danger.

A legal order committed to adult autonomy begins from sovereignty rather than suspicion. Adults are already treated as responsible actors when they enter contracts, assume debt, consume alcohol, use tobacco, consent to medical procedures, participate in dangerous sports, serve in military structures, or accept occupational risk. The same adult cannot be treated as responsible in economic, legal, medical, and civic life, yet presumptively incompetent when making decisions about self-directed psychoactive activation.

The decisive legal question should not be whether a stimulant or activation agent is morally approved, culturally familiar, religiously framed, medically authorized, or research-legitimated. The decisive question should be whether a concrete rights violation or public harm is present. Harm to others, coercive administration, deceptive sale, unsafe commercial distribution, youth targeting, professional negligence, violence, contamination, or serious injury to others may justify legal intervention. In such cases, the basis of intervention is harmful conduct or unsafe market practice, not the mere fact of adult activation or optimization.

This shifts policy from status-based prohibition to responsibility-based consequences. The adult actor remains responsible for concrete consequences. The seller remains responsible for truthful labeling, purity, dosage information, and non-deceptive distribution. Medical and health institutions remain responsible for accurate information, contraindication warnings, interaction guidance, and treatment access. Law remains limited to protecting liberty, preventing concrete harm, and avoiding legal designs that create greater harm through criminal markets, unsafe supply, corruption, or disproportionate punishment [8].

Collective health-cost arguments cannot carry the burden of criminal prohibition. Health systems differ widely, and many jurisdictions rely substantially on private payment, private insurance, or mixed financing. Even in solidaristic systems, the relevant comparison is not use versus no use, but regulated use versus criminalized use. Criminalization does not abolish demand; it often shifts consumption into illegal or gray markets where dose, purity, labeling, and emergency disclosure are worse. In that setting, avoidable costs may arise precisely from prohibition: adulteration, contamination, misdosing, unknown potency, delayed medical help, and unsafe supply.

The cost argument is therefore not a neutral argument for criminalization. It can also be an argument against criminalization. If adults consume stimulants or psychoactive substances regardless of legal status, a transparent and non-criminal model may reduce preventable harms more effectively than punitive control. Legal systems already tolerate costly self-regarding behaviors such as alcohol use, tobacco use, sugar consumption, overeating, obesity-related illness, high-risk sport, chronic overwork, sleep deprivation, and sedentary living. Selectively treating non-sanctioned psychoactive activation as a public-cost problem while accepting familiar legal risks creates an equality and proportionality defect. Cost concerns may support insurance rules, taxation debates, product-quality standards, labeling, or civil liability. They do not by themselves transform adult self-risk into a criminal wrong.

Adult autonomy does not require prior moral approval by the state. It requires responsibility for concrete consequences. If an intoxicated person injures another person, the relevant legal issue is the injury, negligence, liability, recklessness, or homicide, not moral judgment over the substance as such. Civil liability, insurance consequences, professional responsibility, and ordinary criminal law for concrete harm already provide the appropriate legal categories. Psychoactive status should not convert self-regarding adult conduct into a separate moral offense.

20. The Liberty, Harm, and Intervention Threshold Test

The Liberty, Harm, and Intervention Threshold Test is proposed as a structured model for evaluating stimulant substances, psychoactive plants, optimization products, prescription stimulants, peptide-based nootropics, cognitive enhancers, cultural exemptions, and non-classical activation agents. It is designed to clarify when intervention is justified, when civil responsibility is sufficient, and when criminal prohibition exceeds legitimate boundaries.

The test is not a substitute for toxicology, epidemiology, pharmacovigilance, or substance-specific risk assessment. It does not define universal numerical thresholds for lethal dose, therapeutic index, morbidity, dependence potential, or social cost. Such values vary by compound, plant matrix, route, formulation, frequency, population vulnerability, and market context. Quantitative evidence can inform the analysis, but it does not answer the prior legal question: whether the observed risk justifies coercive intervention against adult self-regarding conduct. The function of the test is to structure that justification threshold.

The test proceeds in three stages.

Stage 1: Pharmacological and contextual classification.

The first stage determines what the substance or practice is. Assessment must distinguish plant material, crude botanical matrix, traditional preparation, standardized extract, isolated alkaloid, synthetic derivative, peptide, neurotrophic mixture, pharmaceutical product, commercial supplement, cultural or ritual preparation, or informal preparation. It must also consider mechanism, pharmacokinetic profile, toxicity, dose-response structure, therapeutic index where applicable, route of administration, concentration, purity, interaction burden, and social context. Crude botanical matrices, isolated alkaloids, concentrated extracts, and synthetic compounds must therefore be assessed as separate risk objects rather than collapsed into a single legal category. This stage prevents crude category errors, such as treating coca leaf as identical to purified cocaine, coca tea as identical to rapid-onset cocaine exposure, or all psychoactive plants, peptides, and cognitive enhancers as classical stimulants.

Stage 2: Harm and responsibility assessment.

The second stage asks whether the conduct is self-regarding or whether it creates concrete harm to others. Relevant questions include coercion, fraud, deceptive sale, youth targeting, unsafe commercial

distribution, contamination, serious third-party injury, workplace coercion, and institutional pressure. Adult self-directed use remains within the domain of adult sovereignty unless concrete harm, coercion, deception, or third-party injury is present.

Stage 3: Intervention threshold.

The third stage asks whether any intervention is justified and, if so, which form is least intrusive. Possible responses include no intervention, accurate information, product testing, labeling, civil liability, insurance exclusion, contractual responsibility, age limits for minors, market transparency duties, medical advice, treatment access, or ordinary criminal law for concrete injury, violence, coercion, or homicide. Criminal prohibition of possession or self-directed adult use should be the last and most difficult category to justify. Threshold criteria define risks that may justify stronger intervention even when autonomy, cultural significance, religious exemption, traditional use, or research interest are present. Contextual criteria modify how responsibility should be assigned, but they do not by themselves override adult sovereignty. Severe acute toxicity, serious third-party danger, coercive administration, youth targeting, adulterated supply, or extreme cardiovascular risk may justify intervention directed at the concrete risk. Conversely, cultural unfamiliarity, moral discomfort, secular self-directed use, non-medical use, lack of institutional authorization, jurisdictional inconsistency, or absence from approved markets should not by themselves justify criminalization.

Table 2. Liberty, Harm, and Intervention Threshold Test.

Level	Domain	Core question	Legal implication
Liberty baseline	Adult self-directed use	Is the conduct primarily self-regarding?	Presumption against criminal intervention.
Liberty baseline	Bodily and cognitive autonomy	Does the conduct concern the adult's own body, consciousness, cognition, energy, or performance?	Presumption of adult sovereignty unless concrete harm to others is shown.
Classification criteria	Material form	Is the substance a plant, extract, alkaloid, peptide, synthetic derivative, medicine, supplement, or informal preparation?	Prevents treating unlike substances as one legal object.
Classification criteria	Dose, route, and preparation	Does risk depend on dose, route, concentration, preparation, or formulation?	Supports differentiated assessment instead of substance-wide prohibition.
Classification criteria	Interaction burden	Does risk arise mainly from combinations or cumulative physiological load?	Supports information, product testing, contraindication warnings, and adverse-event reporting rather than criminalization.

Level	Domain	Core question	Legal implication
Concrete harm criteria	Third-party injury	Has another person been injured or put at direct concrete risk?	Civil liability, insurance consequences, professional liability, or ordinary criminal law may apply.
Concrete harm criteria	Coercion or non-consensual administration	Was the substance administered, pressured, or imposed without valid consent?	Coercion-based legal intervention is justified.
Concrete harm criteria	Fraud or deceptive sale	Was identity, purity, dose, or composition misrepresented?	Liability and market sanctions are justified.
Concrete harm criteria	Youth targeting	Is the conduct directed at minors or developmentally vulnerable groups?	Age restrictions and protective rules may be justified.
Market criteria	Product purity and labeling	Can individuals know dose, identity, and contaminants?	Supports testing, labeling, transparency duties, and seller liability.
Market criteria	Unsafe supply	Does prohibition increase adulteration, contamination, or violent markets?	Supports non-criminal access and supply transparency where prohibition worsens harm.
Institutional criteria	Medical double standard	Is comparable activation accepted under prescription but criminalized outside medical channels?	Supports scrutiny of gatekeeping and institutional asymmetry.
Institutional criteria	Research legitimacy	Is activation accepted in research or medicine but criminalized in secular adult self-use?	Supports scrutiny of legitimacy by institutional channel.
Social criteria	Optimization pressure	Does the social environment pressure people to chemically optimize?	Supports limits on coercive institutions, not criminalization of adult users.
Cultural criteria	Cultural exemption	Is autonomy recognized only for approved cultural, Indigenous, or religious identities?	Supports scrutiny of autonomy by status and comparison with secular adult agency.

Level	Domain	Core question	Legal implication
Comparative criteria	Jurisdictional inconsistency	Is the same or similar substance treated as OTC, prescription-only, controlled, tolerated, or prohibited in different jurisdictions?	Supports scrutiny of whether law reflects pharmacological risk or institutional habit.
Proportionality criteria	Less intrusive alternatives	Can the issue be addressed through information, testing, labeling, civil liability, age limits, or ordinary harm law?	Criminal prohibition is disproportionate where less intrusive tools suffice.
Proportionality criteria	Net-harm assessment	Does prohibition reduce concrete harm, or does it increase preventable harm through illegal markets, misdosing, adulteration, contaminated supply, delayed medical help, punishment, or institutional distortion?	Supports comparison of prohibition with non-criminal access, product quality, civil responsibility, market transparency, and ordinary harm law.

This model begins from adult sovereignty and moves outward only when concrete harm, coercion, deception, youth targeting, unsafe commercial conduct, or serious third-party risk is present. It rejects status-based prohibition and replaces it with a threshold model of responsibility. The key question is not whether an activation or optimization agent carries risk. The key question is whether coercive legal intervention is justified despite the adult's primary claim over body, cognition, consciousness, and self-directed risk.

21. Limitations and Future Research Agenda

This paper proposes a conceptual regulatory model rather than a quantitative scoring system. The Liberty, Harm, and Intervention Threshold Test identifies relevant domains, but it does not assign fixed numerical weights to toxicity, dependence potential, cultural significance, youth vulnerability, interaction burden, coercion, market risk, equality concerns, jurisdictional inconsistency, or proportionality. Future research should operationalize the model through case studies and weighting methods that distinguish self-regarding risk from concrete harm to others.

The paper uses a broad concept of activation and optimization. This breadth is necessary for analyzing regulatory inconsistency, but it requires conceptual discipline. Classical stimulants, serotonergic psychedelics, monoamine oxidase-inhibiting plants, adrenergic agents, tonics, adaptogens, prescription medicines, peptide-based nootropics, neurotrophic mixtures, cognitive enhancers, and commercial performance products differ substantially in mechanism, route, dose-response profile, toxicity, dependence potential, withdrawal profile, behavioral risk, and social context.

Implementation requires substance-specific and jurisdiction-specific analysis. The model should be tested against existing partial markets and differentiated legal regimes, including cannabis liberalization, kratom certification or consumer-protection models, coca leaf regulation, khat prohibitions and toleration regimes, prescription stimulant controls, nootropic gray markets, and new psychoactive substance monitoring systems. These comparisons can examine whether non-criminal access, civil liability, product testing, labeling, age limits, adverse-event reporting, or market transparency reduce harm more effectively than prohibition. The present paper provides the conceptual threshold model; empirical application requires separate case studies.

Future research should examine interaction burden, coercive optimization pressure, supplement-market leakage, nootropic gray markets, jurisdictional inconsistency, civil-liability models, insurance exclusions, and cultural-exemption asymmetries. Comparative research should also test the model across liberal, communitarian, privately financed, mixed-financing, public-health-oriented, and paternalistic legal systems. These points define the research program that follows from the model.

The breadth of the paper is intentional but bounded. Activation and optimization are regulatory comparison categories, not claims of pharmacological sameness. The model does not deny differences in toxicity, withdrawal profile, dependence potential, dose sensitivity, route sensitivity, behavioral risk, or interaction burden. It asks whether those differences justify information, civil responsibility, market transparency, medical advice, or coercive prohibition. Its contribution is not a unified pharmacology of stimulants, but a liberty-preserving threshold test for determining when adult self-directed activation becomes concrete harm requiring legal response.

22. Conclusion: From Selective Criminalization to Adult Sovereignty

Modern stimulant regulation reveals a deep contradiction. Societies demand performance, productivity, wakefulness, motivation, endurance, emotional regulation, cognitive capacity, and self-optimization. They commercialize stimulation through coffee, tea, matcha, energy drinks, pre-workout supplements, nicotine products, nootropic beverages, and caffeine-based consumer culture. They medicalize stimulation and cognitive activation through prescription stimulants, wakefulness-promoting drugs, cholinergic enhancers, dopaminergic medicines, peptide-based nootropics, and neurofunctional agents. They operationalize stimulation in military, aviation, and occupational contexts. They culturally exempt some traditional or religious practices. Yet they criminalize other forms of self-directed activation and optimization, especially when these involve non-sanctioned plants, compounds, fungi, peptides, or adult personal use outside approved institutional channels.

The history of stimulant regulation is not the history of society rejecting stimulation. It is the history of institutions deciding which forms of stimulation may be normalized, taxed, medicalized, researched, ritualized, militarized, commercialized, culturally exempted, tolerated, prescription-only, over-the-counter, or criminalized. The law should not distribute adult autonomy by cultural status. Adult psychoactive choice should be evaluated by adult agency, concrete harm, responsibility, and proportionality.

This paper does not treat risk as a reason for silence, stigma, or automatic criminalization. It treats risk as a reason for classification, information, quality control, accountability for concrete harm, and proportionate non-criminal response. The alternative to prohibition is not permission granted by the state, but adult sovereignty with responsibility: adult choice, accountability for concrete consequences, quality-controlled supply, youth protection, civil liability where harm occurs, and transparent risk information.

The problem is not that societies use stimulants, activation agents, nootropics, or optimization tools. They always have. The problem is that modern regulation divides human optimization into respectable, taxable, medical, military, commercial, research-legitimated, ritual, culturally protected, tolerated, prescription-only, over-the-counter, and criminal forms without consistently explaining why. Adults are not required to prove expert knowledge before assuming many familiar risks; the same baseline cannot disappear merely because a substance is culturally unfamiliar, non-medical, botanical, experimental, or outside approved markets. Adult autonomy does not require prior moral approval by the state. It requires responsibility for concrete consequences. A coherent policy must begin from evidence, proportionality, adult sovereignty, risk literacy, and concrete harm - not from inherited stigma, moral discomfort, cultural status, jurisdictional habit, or institutional control over the adult pursuit of functional self-improvement.

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