

SUBSTANCE

Authored by
Mohammed looti

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The Dualistic Definition of Substance: Psychopathology and Metaphysics

The term **substance** carries significant weight across disparate academic fields, fundamentally denoting both a material entity capable of inducing physiological or psychological change, and a foundational, autonomous metaphysical reality. In the context of **psychopathology**, a substance is empirically defined as any material--be it a compound intentionally abused, a prescribed therapeutic medication, or an environmental toxin--that exerts a measurable effect upon the central nervous system, leading to alterations in mood, cognition, perception, or behavior. This clinical definition is inherently functional, focusing on the material's psychoactive properties and potential for dependency or impairment. Conversely, within **philosophy**, substance (or *ousia*) refers to the underlying essence of a thing, that which exists independently, supports its various properties, and retains its identity even as its superficial attributes or external features change due to environmental effects or the passage of time. The critical intersection of these two definitions occurs when considering how physical substances impact the autonomy and perceived immutability of the psychological or philosophical self.

The psychological interpretation of substance necessitates a categorization based on biological interaction. These materials are classified primarily by their capacity to engage with specific neural pathways, often resulting in temporary euphoria, sedation, stimulation, or distortion of sensory input. Materials of abuse, such as **Cocaine**, **alcohol**, or **marijuana**, are prominent examples, though the definition also extends to pharmaceutical agents, such as powerful sedatives or opioids, when used outside of therapeutic guidelines or dosage parameters. Furthermore, the inclusion of toxins acknowledges that neurocognitive impairment can stem from accidental exposure to heavy metals or organic solvents, demonstrating that the designation of "substance" in this domain is dictated by the resulting pathology or impairment observed in the individual, rather than solely by societal or legal status.

The philosophical definition, dating back to classical antiquity, establishes substance as the ultimate ontological bedrock. It is characterized as **individualistic** and **autonomous**, needing no other entity for its existence, serving as the subject that holds all predicates (or "accidents"). According to this tradition, while a person's height, color, or mood (accidents) may fluctuate, the fundamental substance--the essential core of the individual--is posited to remain constant and unchanged. This concept is vital for understanding identity persistence and personal continuity, forming the basis for much of classical metaphysics. The duality inherent in the word "substance," therefore, sets the stage for a profound interdisciplinary inquiry into the relationship between the physical matter that alters consciousness and the enduring, essential nature of consciousness itself.

Classification and Function in Clinical Psychopathology

In clinical practice, particularly within diagnostic manuals such as the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders), substances are meticulously grouped according to their pharmacological action and the associated clinical syndromes they produce. This systematic classification is crucial for accurate diagnosis and tailored intervention, distinguishing between substances that primarily act as central nervous system **depressants** (e.g., alcohol, benzodiazepines), **stimulants** (e.g., amphetamines, cocaine), **hallucinogens** (e.g., LSD, psilocybin), and **opioids** (e.g., heroin, oxycodone). Each category produces a distinct profile of intoxication and withdrawal, rooted in their interaction with specific neuroreceptor sites. The concept of **Substance Use Disorder (SUD)** replaces older, less precise terms like abuse and dependence, recognizing the continuum of severity from mild to severe impairment stemming from the compulsive use of these materials.

The mechanism by which these substances operate involves complex modulation of the brain's intricate neurotransmitter network. Most substances of abuse exert their reinforcing effects by dramatically increasing the concentration of key neurotransmitters, most notably **dopamine**, within the mesolimbic reward pathway. This pathway, often termed the brain's pleasure circuit, links the ventral tegmental area (VTA) to the nucleus accumbens (NAc) and the prefrontal cortex. The resulting flood of dopamine creates an intense, often immediate feeling of reward, which strongly reinforces the behavior of substance seeking and consumption. This powerful biological mechanism underlies the transition from voluntary substance use to compulsive, addictive behavior, where the individual continues to use the substance despite experiencing significant negative consequences across various life domains.

The clinical definition must also carefully delineate between therapeutic application and problematic use. A substance defined as a **medicine**, such as a sedative used to treat acute anxiety or insomnia, operates on the same neurobiological principles as an illicit drug, yet its controlled use under medical supervision aims to restore homeostatic balance or alleviate pathological symptoms. The distinction rests not on the chemical structure itself, but on the pattern of consumption, the resultant impairment, and the development of tolerance and withdrawal. When a medicinal substance is used in excess, for purposes other than those intended, or when it leads to significant functional impairment, it transitions into the realm of problematic substance use, subjecting the individual to the diagnostic criteria for SUD.

Furthermore, a complete psychopathological perspective includes substances that are primarily **toxins**. These substances, often encountered in occupational or environmental settings, do not necessarily produce euphoria but cause direct neurological damage, leading to disorders such as substance-induced neurocognitive disorder. Examples include lead, mercury, manganese, and industrial solvents. While lacking the addictive profile of recreational drugs, these materials meet

the definition of a psychoactive substance because their ingestion or absorption results in profound and clinically significant alterations to mental function, highlighting that the core criterion for substance classification in this field is the capacity to alter, damage, or disrupt normative psychological processes.

Neurobiological Mechanisms of Psychoactive Agents

Understanding the neurobiology of psychoactive substances requires a detailed examination of how these exogenous compounds mimic, block, or enhance the action of endogenous neurotransmitters. The reinforcing power of virtually all addictive substances funnels through the dysregulation of the **dopamine reward pathway**. Dopamine release, naturally triggered by essential survival behaviors such as eating and reproduction, signals salience and motivates approach behavior. Psychoactive substances hijack this system by causing a release of dopamine far greater and faster than natural stimuli, effectively overriding the brain's internal regulatory mechanisms and establishing a pathologically strong connection between the substance cue and reward.

Consider the example of **Marijuana** (*Cannabis sativa*) and its primary psychoactive component, **delta-9-tetrahydrocannabinol (THC)**. THC acts primarily by binding to cannabinoid receptors (CB1 and CB2) found densely in areas controlling pleasure, memory, concentration, and coordinated movement. THC functions as an agonist, mimicking the body's natural endocannabinoids (like anandamide). When THC binds to CB1 receptors on GABAergic neurons in the VTA, it inhibits the release of GABA, which is an inhibitory neurotransmitter. This disinhibition effectively removes the "brake" on the dopaminergic neurons, provoking a substantial and sustained release of **dopamine** into the nucleus accumbens. This subsequent surge of dopamine is what causes the feeling of being "**high**," characterized by euphoria, altered time perception, and relaxation, thereby powerfully reinforcing the consumption behavior and establishing the substance's addictive potential.

Chronic exposure to these high levels of artificial stimulation initiates profound neuroadaptation, leading to phenomena known as **tolerance** and **dependence**. Tolerance develops as the brain attempts to restore equilibrium by reducing the number or sensitivity of its receptors (downregulation) or decreasing endogenous neurotransmitter production. Consequently, the user requires increasingly higher doses of the substance to achieve the desired effect, escalating the risk of toxicity and overdose. Dependence occurs when the body has adapted to the presence of the substance to such an extent that its cessation leads to physical and psychological withdrawal symptoms, which are often the antithesis of the intoxication effects (e.g., anxiety and tremors following alcohol cessation), further motivating continued use to avoid discomfort.

Furthermore, a crucial element in the progression to severe SUD is **sensitization**, particularly

related to craving and cue reactivity. While tolerance affects the initial rewarding feeling, sensitization involves the heightening of the neural response to substance-related cues (paraphernalia, locations, smells). Over time, repeated exposure makes the reward circuit hypersensitive to these environmental triggers, leading to intense cravings even after long periods of abstinence. This mechanism explains why recovery is often a lifelong process of managing environmental triggers, as the pathological learning pathways established by the chemical substance remain highly active and reactive, driving the compulsive seeking behavior independent of the initial desire for pleasure.

Substance Metaphysics: The Aristotelian and Cartesian Legacy

Shifting to the metaphysical domain, the philosophical concept of **substance** addresses the fundamental nature of reality itself. Classical philosophy, heavily influenced by Aristotle, sought to identify the ultimate subject of existence--that which exists in itself, rather than in another. For Aristotle, substance (*ousia*) is what persists through change, acting as the substratum for all accidental properties. If a leaf changes color from green to yellow, the color (an accident) changes, but the substance--the leaf itself--remains. This primary substance is the individual entity, the concrete particular, which holds the highest ontological priority because it is capable of independent existence and serves as the subject of all predication.

The Cartesian revolution profoundly redefined substance, demanding a stricter criterion for its definition. René Descartes posited that substance is "a thing which exists in such a way as to need no other thing in order to exist." This rigorous definition led to the classical formulation of **Cartesian Dualism**, wherein only two types of true substances exist: *Res Cogitans* (Thinking Substance or Mind) and *Res Extensa* (Extended Substance or Matter/Body). For Descartes, the Mind substance is characterized by thought, is non-extended, and is indivisible; the Body substance is characterized by spatial extension, is divisible, and is unthinking. This separation created the notorious mind-body problem--how these two radically different, independent substances could possibly interact to produce the unified human experience.

Following Descartes, Baruch Spinoza radically simplified the ontological landscape by asserting **Monism**. Spinoza argued that, based on Descartes' own definition, only one entity could truly satisfy the criteria of needing nothing else to exist: **God or Nature (Deus sive Natura)**. For Spinoza, this single, infinite, eternal Substance is the sole reality. Both mind and matter are merely **attributes** (ways of conceiving the substance) or **modes** (particular, finite manifestations) of this singular, underlying reality. This view eliminated the dualistic problem of interaction but shifted the philosophical challenge to reconciling individual autonomy and existence within an infinite, necessary whole.

These classical definitions underscore the notion that philosophical substance is defined by its

autonomy and **persistence**. It is that which is self-sufficient and **unchanged** in its essence, even if its outward features are subject to flux. This metaphysical persistence is deeply challenged when considering the psychological consequences of chemical substances, as the radical alteration of consciousness and identity induced by psychoactive agents forces an inquiry into whether the physical body, when chemically altered, can truly compromise the integrity of the supposedly autonomous, non-material thinking substance.

The Empiricist Challenge and the Problem of Persistence

The rationalist view of substance faced severe scrutiny from 17th and 18th-century British Empiricists, notably John Locke. Locke agreed that qualities or accidents (like whiteness, hardness, or warmth) must inhere in something, but he argued that we never directly perceive the substance itself. Instead, the concept of substance becomes a necessary, yet unverifiable, assumption--an "I know not what" that serves as the theoretical support for observable qualities. For Locke, the notion of substance is essentially a mental placeholder, an inferred core reality used to organize our sensory experiences, rather than a self-evident truth about the world. This critique began the erosion of the classical understanding of substance as an immutable, knowable foundation.

David Hume took this skepticism further, applying it not only to material substance but also to the idea of a persistent, inner mental substance--the self. Hume argued that when he introspected, he only ever encountered a bundle or collection of fleeting perceptions (thoughts, feelings, sensations), never a unified, persistent "I" or soul substance. If all knowledge derives from sensory experience, and sensory experience never confirms an unchanging substratum, then the concept of substance, whether material or mental, becomes philosophically problematic and potentially dispensable. This radical empiricist perspective challenges the stability and autonomy central to the classical definition.

The philosophical problem of persistence is intimately tied to the original definition: how a substance remains **unchanged** despite changes in its properties. This is known as the problem of identity over time. If the essence of an individual is tied to a specific mental or physical substance, how can that identity be maintained across a lifetime of physical replacement (cellular turnover) and psychological transformation (memory loss, personality changes)? The concept of a persisting substance provides the logical framework for continuity, but the empirical lack of evidence for a truly unchangeable core forces philosophy to seek alternative explanations for identity, often relying on continuity of memory, consciousness, or narrative, rather than an underlying, immutable substrate.

Interdisciplinary Synthesis: Substance, Identity, and Agency

The modern convergence of psychology, neuroscience, and philosophy reveals a complex interplay between the chemical **substance** and the metaphysical substance (identity). When psychoactive agents dramatically alter consciousness, memory, and emotional regulation, they pose a direct challenge to the philosophical ideal of an autonomous, **unchanged** self. If the core identity, encompassing moral character and rational capacity, is fundamentally dependent upon the delicate homeostatic balance of neurotransmitters and neural structures, then the physical substance has the power to compromise the metaphysical substance.

The core feature of **Substance Use Disorder** is the loss of **agency**--the capacity for rational self-governance. The compulsive substance seeking observed in addiction is often described as behavior driven not by free will or choice, but by pathological changes in brain circuitry, particularly in the prefrontal cortex (responsible for executive function) and the reward pathways. From a Cartesian perspective, this suggests that the material substance (the drug) has corrupted the physical structure (the body) to the extent that it dictates the actions of the thinking substance (the mind), raising profound ethical and metaphysical questions regarding responsibility and moral culpability.

Therapeutic interventions for SUD are fundamentally aimed at restoring the individual's autonomy and capacity for rational decision-making. Through pharmacological treatment and behavioral therapies, clinicians seek to recalibrate the neural systems that have been pathologically adapted by the chemical substance, effectively working to restore the integrity of the individual's philosophical substance--the self capable of independent thought and self-control. This process implicitly affirms the idea that personal identity and agency, while theoretically autonomous, are practically contingent upon the health and function of the physical brain.

In conclusion, the concept of substance serves as a critical bridge between the material world and the world of experience. Whether defined as a chemical entity capable of altering physical reality or as the fundamental substratum necessary for existence, the enduring impact of substances underscores the fundamental connection between mind, matter, and the fragile nature of personal identity. The study of psychoactive substances provides empirical evidence that the philosophical ideal of an entirely autonomous, unchanging self is deeply interwoven with, and vulnerable to, the tangible, molecular realities of the physical world.