




Hallucinations and Hallucinogens: Psychopathology or Wisdom?

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Abstract Hallucinations are currently associated almost exclusively with psychopathological states. While it is evident that hallucinations can indicate psychopathology or neurological disorders, we should remember that hallucinations also commonly occur in people without any signs of psychopathology. A similar case occurs in the case of hallucinogenic drugs, which have been long associated with psychopathology and insanity. However, during the last decades a huge body of research has shown that certain kinds of hallucinations, exerted by hallucinogenic drugs, may serve to improve mental health. We propose that, in light of historical, epidemiological, and scientific research, hallucinations can be better characterized as a common phenomenon associated sometimes with psychopathology but also with functional and even beneficial outcomes. In the last sections of the manuscript, we extend our argument, suggesting that hallucinations can offer a *via regia* to knowledge of the mind and the world. This radical shift in the cultural interpretation of hallucinations could have several implications for fields such as drug policy, civil law, and psychiatry, as well as for the stigma associated with mental disorders.

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Introduction

Humans have been seeing things that do not objectively exist and hearing voices that come only from their minds. In the Ancient Greece, hallucinations were represented by the goddess Pasithea. Neither the Greeks nor the Romans had an equivalent term for “hallucination.” While the Latin word *Alucinatio* (*ad*-next to; *lucem*-light) meant “mental wandering” in general, there were various terms used in Greek to refer to different kinds of hallucinations, depending on their nature or content (*phantasmata*, meaning shadowy apparitions; *eideola*, meaning images; or *doxai*, meaning appearances). However, they did not have a general term for all of them (Harris, 2013). The Bible is full of hallucinatory episodes, like the well-known conversion of Paul the Apostle to Christianity who received intense and vivid visual and auditory hallucinations. Prominent Catholic spiritual leaders like Saint Augustine and Saint Thomas Aquinas also discussed hallucinations (Sarbin & Juhasz, 1967). The story of hallucinations would be even larger if we were to consider all of the hallucinatory states induced by ritualistic practices, including mortification practices and the use of psychoactive/hallucinogenic natural products (de Felice, 2011; Furst, 1976; Harner, 1973). For instance, nearly 90% of human cultures have developed some kind of technique to induce altered states of consciousness (Bourguignon, 1973), in which hallucinations are common. Hallucinations are universal phenomena widely found in folk/traditional medicine. They are culturally meaningful and not simply signs of psychopathology (Larøi et al., 2014).

Beyond the universality of hallucinations, early ethnographic studies have shown the relevance of cultural factors to the modulation of hallucinatory experiences, as well as to their understanding and interpretation. Scott (1967) noted differences in the content and characteristics of hallucinatory experiences between African and European psychotic patients. While the former usually reported that hallucinatory voices spoke to them directly, the latter reported hearing voices speaking in the third person. Among African patients, the voices tended to be recognizable (mostly as their ancestors or God), while for white patients the voices were unknown. Edger-ton (1966) also noted conceptual differences in psychosis between four East African societies. While some groups attributed the disease to “worms in the brain” or life stress, others believed psychosis was an illness occurring for no reason at all. According to Wallace (1958), the Iroquois understood hallucinations as being possessed by spirits or caused by witchcraft. Research has confirmed these findings, showing phenomenological differences in hallucinations across cultures (Kent & Wahass, 1996; Suhail & Cochrane, 2002). This evidence points toward the need to decolonize the term “hallucination” since the Western, psychiatric view has been exported to other cultures and has influenced the ways these phenomena are viewed and interpreted. There is a distinctive, established relationship different cultures have with hallucinations. Therefore we need to decolonize this term in order to reach a better understanding.

Early Western psychiatry classified hallucinations as symptoms pointing to an underlying psychopathology. Many psychiatrists and philosophers conducted several debates and discussions about the nature and origin of hallucinations. Indeed, the concepts of normal versus abnormal/pathological to describe health versus disease were introduced to biology and medicine in the early nineteenth century. They are not objective scientific concepts but a result of political, cultural, economic, and technological influences (Benedict, 1932; Canguilhem, 1991). Therefore, the definition of what is pathological depends on the circumstances in which symptoms are observed. Moreover, serious doubts exist regarding the extent to which science can inform objectively about an “abnormal” state (Foucault, 2002 [1966]). This abnormality is assumed to be objective and categorical, and thus medicine has developed “normality ranges” that can be tested through objective analysis (e.g., blood analysis and electrocardiogram). In the case of psychiatry, the “normality range” is much vaguer and wider, highly influenced by the commonality of certain states in a given social context or culture, among many other factors (Rudnick, 2000). In addition, the use of ranges in medicine is justified by the oscillatory nature of most quantifiable parameters of biological organisms, and the same thing happens in psychological terms. Most people can experience psychopathological symptoms at some point, but this does not mean that they are developing a mental disorder. Thus, considering this epistemological context, there is no reason to consider hallucinations as exclusively psychopathological symptoms.

Nonetheless, at the beginning of the twentieth century, the pathological view of hallucinations was reinforced. They were associated with psychotic and other mental disorders, showing how a cultural conception can shift the meaning attributed to hallucinatory experiences. According to Pienkos et al. (2019), the operationalization of mental phenomena, in conjunction with the limitations of language and Western medical models, results in a lack of appropriate words or concepts to relate the subtle and fluctuating forms of the hallucinatory experience. This pathological view of the term “hallucination” led to other altered states of consciousness being generally viewed as pathological as well, including those induced by hallucinogenic drugs. This led to the stigmatization of people who either experience hallucinations or search for them deliberately using psychoactive drugs. Consequently, the term “hallucinogen” acquired pejorative connotations even when used to describe the effects of psychoactive drugs like mescaline or psilocybin.

Notably, many authors in the field of psychedelic studies consider it incorrect to define psychoactive drugs as “hallucinogenic” (Nichols, 2004; 2016). Indeed, an increasing number of authors are using the word “psychedelic” (from the Greek words *psyche* [mind] and *delos* [visible]; thus, “to see/manifest the mind”) or “psychedelic-assisted psychotherapies” to refer to these drugs and their uses, respectively (Nutt et al., 2019; Reiff et al., 2020). However, from our perspective, the term “psychedelic” is still overly attached to the psychedelic counter-/hippie-culture of the 1960s–1970s and its associated sub-products (art, music, clothes), as well as to current recreational use. Moreover, the media is using the term increasingly loosely and often with an uncritical positive bias (e.g., psychedelic “miracle” or wonder drugs) (MacClelland, 2017; Reader, 2019). In addition, the term “entheogen” (Ruck et al., 1979), another

commonly used term, has a religious connotation as it refers to “bringing forth the divine within.”

The term “hallucinogen” was used by several pioneering authors of the field, such as American biologist Richard Evans Schultes (considered the father of modern ethnobotany), Albert Hofmann (who synthesized lysergic acid diethylamide [LSD] and isolated and synthesized psilocybin), and American anthropologists Marlene Dobkin de Rios, Peter Furst, and Michael Harner (Dobkin de Rios, 1972; 1984; 2008; Furst, 1972; 1976; Harner, 1973; Schultes & Hofmann, 1992; 1980). Furthermore, the terms are commonly used alone or together with “psychedelics” by several relevant research groups in this field (including in our own work) (Barrett & Griffiths, 2018; dos Santos & Hallak, 2020; dos Santos et al., 2020; Griffiths & Grob, 2010; Johnson et al., 2008; Preller & Vollenweider, 2019; Vollenweider, 2001).

The recent interest in the clinical use of hallucinogenic drugs strongly challenges the assumption that hallucinations are exclusively pathological phenomena. Beyond not being pathological, they seem to be beneficial in clinical contexts (dos Santos & Hallak, 2020; Ona & Bouso, 2020). Moreover, for many Indigenous cultures, hallucinogenic plants allow them to stay in contact with the *true* nature of reality rather than escape from it by creating illusions (Dobkin de Rios, 1972; 1984; Furst, 1972; 1976; Hahn, 1973; Harner, 1973; La Barre, 1959; Luna & Amaringo, 1999; Munn, 1973).

The term hallucination is still a disputed, controversial term. Different names such as “visual symbols,” “phantasy mode of consciousness,” “presentational symbolism,” or “visual epistemology” could be proposed. We leave it open for future work to explore these possible conceptual alternatives. There are also a number of very interesting theoretical models of hallucinations (Brouwer & Carhart-Harris, 2021; Horváth et al., 2017; Lohmar, 2010; 2016; Winkelman, 2010, 2017, 2018) that future studies should subject to experimental validation.

This article will discuss how hallucinations might be conceived of as symptoms that suggest an underlying pathology and sometimes as desirable phenomena that offer therapeutic benefits for various mental illnesses. While challenging the current pathology-associated view of the term “hallucination,” this concept will be first reviewed from a historical perspective, focusing on the research carried out in the Western culture. The text will then examine the results of such scientific research, providing the psychological interpretations and explanatory models developed in the last decades. This will allow the reader to be aware of the state of the art within this field. The two following sections will first discuss the extent to which hallucinations occur in the general population, suggesting that this phenomenon might be more common than usually thought. It will then offer a detailed discussion about hallucinations associated with psychopathology, in order to offer a balanced argument. The final section will suggest that hallucinations may be considered a source of knowledge due to their distinct characteristics.

Western History of Hallucinations

The Western study of hallucinations started in the middle of the nineteenth century, when the recreational use of drugs that can induce hallucinations, such as hashish and opium, expanded in European countries. This phenomenon attracted the

attention of many psychiatrists who tried to explain hallucinations in various ways (West, 1975). Esquirol introduced the term “hallucination” into psychiatry (Esquirol, 1845, cited by Telles-Correia et al., 2015). Before that, hallucinations were only considered a visual phenomenon, and there was no unified view regarding hallucinations. Visions, apparitions, phantoms, fantasies, supernatural insights, etc., were considered different phenomena (Berrios & Marková, 2012). Esquirol unified and extended the concept to include all the other senses. French psychiatry then began a wide debate regarding hallucinations, which revolved around two different dichotomies. First was whether hallucinations are an involuntary exercise of memory and imagination or if they are a response to abnormalities of the senses. Second, whether hallucinations are always pointing to underlying pathology or if they can occur without the presence of mental illness. According to Esquirol, hallucinations are a form of delirium or madness originating in the brain, “This symptom of delirium has been mistakenly identified by all authors with local lesion of the senses [...] In hallucinations everything happens in the brain: visionaries dream awake. The activity of the brain is so energetic that the visionary or the hallucinated gives a body and reality to images and ideas that memory reproduces, without the intervention of the senses” (Esquirol, 1845, cited by Telles-Correia et al., 2015). Esquirol (1845, cited by Telles-Correia et al., 2015) stated that hallucinations are not perceptions but, rather, “a form of delirium that makes patients believe they have a perception.”

Moreau de Tours, who was Esquirol’s disciple, defined hallucinations as a symptom of mental illness. Contrary to Esquirol, he believed they were an issue with the brain’s functionality as opposed to a disease. Paradoxically, Moreau de Tours used hallucinogenic drugs like hashish, belladonna, chloroform, ether, opium, aconite, and henbane to induce more manageable hallucinations that could heal patients, making him the first to consider hallucinations therapeutic (Moreau de Tours, 1845). Moreau de Tours is considered the first psychopharmacologist since he was the first to attribute mental illness to a perturbation of the functionality in the brain that could be corrected using drugs. However, drugs were not used to correct possible chemical imbalances as the current psychiatric paradigm suggests, but for the psychological experiences that they induce. Regarding the association between chemically induced hallucinations, psychopathology, and dreams, he suggested that they all share the same origin. As he stated, “I had seen in hashish, or rather in its effects on the mental faculties, a unique powerful means of exploring the field of mental pathology” (Moreau de Tours, 1845). In any case, neither Esquirol nor Moreau de Tours considered hallucinations to be the cause of psychopathology, but rather a symptom.

While psychological theories gained some advocates, such as Michéa (1851), Falret (1864), and Griesinger (1867), sensory theories were later postulated and defended by Tamburini (1881) and Chaslin (1912). As this approach became dominant, the semantic content or the social context of the patients faded into the background, since hallucinations were understood as the random stimulation of nerve centers (Telles-Correia et al., 2015). Conversely, an integrated approach was proposed by the German researcher Edmund Parish at the end of the nineteenth century. Parish stated the dichotomy between the psychological and the sensory origins of hallucinations is meaningless, since the centers of imagination and sensory stimuli are in close proximity in the brain. Thus, both the central and peripheral sensory

regions and the ideational and sensory regions of the brain would be affected (Parish, 1897). Remarkably, until the second half of the nineteenth century, the available literature on hallucinations was based on individual case studies collected from clinical settings (Berrios & Marková, 2015). However, the study of this phenomenon among healthy people progressively increased until the end of the nineteenth century, when the first large-scale survey assessing the prevalence of hallucinations among the general population was conducted in the United Kingdom. Researchers found 10% of the sample (N=15,316 people) reported experiencing hallucinatory phenomena (Sidgwick et al., 1894).

Hallucinations were considered the main symptom of schizophrenia at the beginning of the twentieth century, based on Esquirol's influence and the new classification of disorders that Kraepelin proposed (Bromberg, 1940). Later, Schneider suggested that auditory hallucinations should be considered a “first-rate” symptom of schizophrenia (Schneider, 1951). It is worth noting that there were various concepts similar to hallucinations, such as illusions and pseudohallucinations, but their use was not always consistent. Jaspers defined hallucinations as the opposite of illusions, defining the latter as a phenomenon produced by the alteration of real perceptions. Hallucinations were defined in terms of highly detailed visions with sensorial consistency, and a strong sense of objectivity (Jaspers, 1971). Similarly, Slade and Bentall (1988) suggested that hallucinations could be caused by an inability to distinguish if an object is real or a product of the imagination, suggesting a deficit in the metacognitive capacity to assess/discriminate reality. The French psychiatrist Henry Ey complemented these views, claiming, as Esquirol did, that hallucinations consist of perceptions without objects. Ey classified hallucinations into two categories. First are the hallucinations produced by alterations to the state of consciousness, also called the oneiroid type. Second are hallucinations produced by a disruption in the self, which are characteristic of schizophrenia (Ey, 1973). In contrast, López-Ibor (1964) theorized that in normal perception the signal's transmission is deposited at a site in the central nervous system in the form of an engram. Hallucinations could then be elicited by the engrams' involuntary and erroneous activation. At the end of the century, Berrios (1995) introduced a broader classification of hallucinations, as “verbal reports of sensory experiences with or without insight, not vouchsafed by a relevant stimulus,” which led to the definitive rejection of those similar concepts previously mentioned, such as pseudohallucinations and hallucinosis.

Apart from descriptive psychopathology, some explanatory models were developed in the late 20th and early twenty-first centuries which mostly focused on describing the underlying cognitive mechanisms and neural basis of hallucinations. However, there are exceptions, such as psychoanalytic and Jungian theories.

Psychological Interpretations and Explanatory Models of Hallucinations

Hufford (2005) used Ernest Jones' book *On the Nightmare* as an example of how psychoanalytic theory could assimilate a wide range of spiritual belief and experiences into reductive explanations. Hufford described this reductionism as an

elaboration of Hume's principle of the non-rational nature of spiritual belief by Freud and other authors. This process would, among other views of psychoanalysis, conceptualize religious beliefs as a neurotic defense or an unconscious theory. Spiritual experiences were therefore systematically pathologized under the category of "hallucinations." Freud initially conceived of hallucinations as resulting from traumatic experiences. However, he later defined them as fantasies (Eigen, 2005). For Jung, hallucinations contain a "germ of meaning," so they must be carefully described and analyzed (Jung, 1963, cited by Telles-Correia et al., 2015).

Other models, such as the cognitive model, describe the different mechanisms where hallucinations appear instead of interpreting their content. For example, Frith and Done (1989) explained hallucinations as the result of neuropsychological malfunctions in the monitoring of speech. Bentall (1990) proposed problems in monitoring occur at the source of verbal material. Regardless of discussions concerning the existence of malfunctions and the level at which they occur, the cognitive model has been applied to isolated cognitive factors potentially associated with the appearance of hallucinations (e.g., the hyperactivation of cognitive schemas, the predisposition of auditory imaging, or enhanced perceptualization) and their maintenance (e.g., confirmatory behaviors or beliefs about the voices). For a review, see Beck & Rector (2003). The "sensory overrides" model by Luhrmann can also be considered cognitive. Based on the assumption that there are fundamental differences between pathological and non-pathological hallucinations (Luhrmann et al., 2010), the author described three patterns of hallucinatory experiences: sensory overrides, psychosis, and the Joan of Arc. When a sensory override occurs, there is a perception (such as voices or objects) in the absence of stimuli. Luhrmann states that this phenomenon, although highly widespread in the general population, tends to only happen to the same person once or twice a year (Luhrmann, 2011). The author of this model also suggests that sensory overrides would be associated with absorption, meaning that those who focus their attention on the content of their thoughts or imagination rather than on external distractions are more susceptible to experiencing these kinds of hallucinations. In fact, people experiencing sensory overrides score higher on absorption scales (Luhrmann et al., 2010). Psychosis would be a psychiatric condition in which someone has an impaired ability to distinguish real from unreal. The Joan of Arc pattern is much less common. It consists of the same symptoms and/or experiences of someone suffering from schizophrenia, but without the associated distress, cognitive impairments, or emotional flatness (Luhrmann, 2011).

The anatomical model has been used to explore the brain regions associated with hallucinations. The most consistent finding is an association between auditory hallucinations and structural abnormalities in the superior temporal gyrus and inferior frontal gyrus, enhanced connectivity in the arcuate fasciculus, and functional activation in the superior temporal gyrus and inferior frontal gyrus, insula, cingulate, cerebellum, and supramarginal gyrus (McCarthy-Jones, 2012). The biochemical model is based on neurotransmitters. It was developed after the emergence of antipsychotic drugs and followed the observation that a decrease in central dopamine could alleviate certain psychotic symptoms, including hallucinations. Other endogenous compounds have been associated with psychotic symptoms, such as dynorphin (Clark &

Abi-Dargham, 2019) and endocannabinoids (Rodríguez-Muñoz et al., 2017), but the evidence is weak and would not be specific to hallucinations.

Beyond these general approaches, different groups have developed their own explanatory models instead of testing and refining previously proposed models. This has made it challenging to reach an agreement on the elemental ways of proceeding with research. For instance, while some groups categorize different hallucinatory syndromes based on phenomenology, other groups distinguish them by etiology (Collerton et al., 2015). Multifactorial models probably offer the best framework to work with. They are used specifically in the research of visual hallucinations. The best examples are the Perception and Attention Deficit (PAD) model (Collerton et al., 2005) and Hobson's Activation-Input-Modulation (AIM) model (Hobson et al., 2000). Whereas earlier unimodal models were solely focused on isolated findings (alterations in neurotransmitter systems, lesions in the brainstem, and sensory deprivation), multifactorial models are capable of integrating findings obtained from different domains. These models understand hallucinations as being the result of complex interactions between external sensory inputs, degrees of alertness, and modifications in biochemistry induced by endogenous/exogenous compounds.

According to Collerton et al. (2005), a good model should be applicable to a variety of conditions with recurrent complex visual hallucinations, including dementia, delirium, drug-induced encephalopathies, schizophrenia, and eye diseases. Unfortunately, while each of these models is productive in terms of research, they cannot explain the different circumstances in which hallucinations occur. Therefore, it is challenging to determine if one model is better than the others. All are weakly predictive and fail to explain the complexity of the hallucinatory process. They cannot effectively combine the rich phenomenology with both neuropsychological functioning and multifactorial neuroanatomic and biochemical alterations. This has several consequences in terms of the public understanding of such phenomena, because the experience of hallucinating is socially perceived as something undesirable and directly linked to psychopathology. This misguided perception eventually causes harm to people who experience hallucinations. But, more importantly, it stigmatizes people who have mental disorders where hallucinations may appear.

Hallucinations as the Norm

Early reports noted instances in which insight was gained during hallucinations and they therefore were not associated with underlying psychopathology. This is the case of the well-known German bookseller Christoph F. Nicolai, who published the 1799 essay, *Memory of the apparition of ghosts or specters caused by disease with psychological considerations* (Brierre de Boismont, 1862). Additionally, Saint Teresa and many other renowned mystics experienced hallucinations without the development of psychopathology. Modern studies reported that the percentage of healthy people who experience some kind of hallucination ranges from 8 to 25% (Dhossche et al., 2002; Langer et al., 2005; Larøi & Van der Linden, 2005; Ohayon, 2000; Tien, 1991), and that the phenomenon is transcultural (McGrath et al., 2015). No

relationship has been observed between the tendency to experience hallucinations and the presence of psychopathology (Böcker et al., 2000; David, 2004).

These findings suggest that hallucinations should be considered a normal phenomenon. These experiences therefore can occur in non-clinical populations without the danger of developing psychotic disorders (Parra, 2009). It is worth noting that this is in line with a recently developed model called pivotal mental states (PiMSs), in which it is claimed that stressful and intense psychological states (PiMSs) can lead to either mystical or psychotic experiences in certain individuals, being most of times the distinction between them a matter of negative/positive outcome (Brouwer & Carhart-Harris, 2021).

Moreover, the definition of hallucination is included in the DSM-V and states that some hallucinatory experiences should be considered normal, “those (hallucinations) that occur while falling asleep (hypnagogic) or waking up (hypnopompic) are considered to be within the range of normal experience. Hallucinations may be a normal part of religious experience in certain cultural contexts” (APA, 2013). Despite this significant advancement in defining hallucinations, we suggest that this should also normalize other hallucinatory experiences and recognize the positive effects they may have. We will briefly describe hallucinatory occurrences experienced by a significant percentage of the general population that are not generally associated with psychopathology.

Grief Hallucinations

After the loss of close relatives or friends, it is common to hallucinate their voices, their presence, or even their touch (Castelnuovo et al., 2015; Ratcliffe, 2020). Grimby (1993) reported that up to 82% of the surviving spouses in his sample (N=62) experienced hallucinations one month after bereavement. All but one of the subjects reported that the experiences were pleasant and comforting. In Japanese studies, up to 90% of surviving spouses have experienced post-bereavement hallucinations (Yamamoto et al., 1969). Research has found that hallucinations involving talking to or being touched by a deceased spouse can be beneficial for the grieving process (Baethge, 2002; Grimby, 1993; Miller et al., 1993).

Sleep Paralysis

This phenomenon consists of total or partial paralysis while sleeping, except for the eyes and the pharyngeal muscles. This experience is often accompanied by visual and auditory hallucinations, sometimes associated with intense fear. Studies have reported that 40 to 50% of the general population experiences sleep paralysis at least once in their lives (de Jong, 2005; Lishman, 1978; Parkes, 1985), and it is not associated with increased psychopathology (Ness, 1978). The experience of sleep paralysis is remarkably similar between different cultures, particularly concerning the sensation of the presence of other beings. Indeed, in the Roman Empire, people referred to these events as visits from the *incubus* (from *incubare*=to sit on), a demon that would sit on one’s chest and bring nightmares. Now, people can still

see a human or an animal sitting on their chest (de Jong, 2005). The inhabitants of Newfoundland use the name “Old Hag” (an old English term for a witch) to refer to this phenomenon. In Ethiopia, the explanation refers to a Zar ghost sitting on the victim’s chest (de Jong, 2005). In China, it is called *bei Guai chaak* (being pressed by a ghost) (Emmons, 1982).

Near-Death Experiences

Hallucinations can arise when a person believes that they almost died (e.g., heart attack) or after long periods of illness, such as cancer or other diseases. These experiences were previously described in the Bible (Bentall, 1990), Medieval Christian writings (Zaleski, 1987), and in medical reports by physicians at people’s deathbeds (Osis, 1961). A survey of palliative inpatients reported that 47% of patients experienced recent hallucinatory phenomena (Fountain, 2001), suggesting that this is quite common among dying patients. It has been noted that near-death experiences (NDEs) occur in 10% of cases when patients recover from a medical crisis or coma (van Lommel, 2004). This percentage differs across cultures. For instance, the prevalence of NDEs in India and in the Republic of Moldova has been reported as 30% (Kellehear et al., 2012; Muthumana et al., 2011). Generally, patients interpret NDEs as positive and comforting (Kellehear, 2017). Indeed, people suffering NDEs have reported positive psychological and existential developments in self-perception, connection to others, and philosophy of life (Cozzolino, 2006; Khanna & Greyson, 2015). However, this experience could also cause harmful effects, such as posttraumatic stress disorder (PTSD) symptoms associated with the experience itself, because it could be interpreted as too intense or disturbing. In Western culture there is a lack of philosophical and religious systems capable of embracing these powerful experiences, so many patients do not share these experiences with others because they are afraid of being considered “crazy.” As a result, isolation from others and feelings of being misunderstood are common in people who have experienced NDEs (Bush, 2014; Greyson, 2001, 1997). NDEs can also be induced by some hallucinogenic drugs, such as ketamine (Jiménez-Garrido et al., 2015) and DMT (Timmermann et al., 2018). While Timmermann et al. (2018) did not report on potential negative or harmful effects produced by DMT, a study by Jiménez-Garrido et al. (2015) reported that 10% of ketamine users showed PTSD symptoms after a ketamine-induced NDE.

Religious and Spiritual Practices

Human history is full of examples of hallucinatory experiences in religious or spiritual practices. The voices hallucinated by the Pythonesses of Delphi were highly valued for centuries. In Dodoua, many people hallucinated the voice of Zeus. The goddess Artemis could be heard by the priests of Ephesus. People had to remain inside a dark cavern for a long time to hear the advice of Trophonius of Lebadaea (Parra, 2014; Watkins, 2003). Similarly, several mystics and saints hallucinated voices, divine presences, or reported transcendental experiences that can be clearly

differentiated from psychotic experiences due to the absence of impulsivity and self-reference, duration, coherent evolution (Austin, 1998), and other psychopathological symptoms (Buckley & Galanter, 1979; Jackson, 1997; Pratt, 1920; Spanos & Moretti, 1988).

The religious or spiritual practices of several cultures include the induction of altered states of consciousness through dancing, drumming, fasting, mortification practices, hyperventilation, and the use of hallucinogenic drugs. The meaning of the hallucinations is embedded in the local worldview and is therefore shared and valued by the whole community (Parra, 2014). This is clearly different from how hallucinations are usually interpreted in modern Western societies.

Use of Hallucinogenic Drugs

Hallucinogenic drugs induce different types of hallucinations. In the case of salvinorin-A, the modification of dimensionality is common. Subjects can see themselves in a bidimensional or multidimensional manner, while their perception of external sensory stimuli is completely blocked (González et al., 2006; Maqueda et al., 2015; 2016).

Some authors in the field of psychoactive drug research have stated that “hallucinogens” is not an appropriate term because it is pejorative, and the drugs do not induce hallucinations in typical dosages (Nichols, 2004; 2016). Other authors, like Metzner (1998), have stated that the term “hallucinogen” deserves to be rehabilitated, since the original meaning of the word *alucinare* (wandering in one’s mind, traveling in inner space) is actually quite appropriate given the elicited subjective experiences. We agree with Metzner and disagree that hallucinogenic drugs do not induce hallucinations. We have shown above how “hallucinations” are not pathological phenomena per se. Additionally, a systematic mistake has been made in the conceptualization of those hallucinations. At low or medium doses, only visual distortions, a generalized modification in the stimuli perception, and increases in the richness of mental imagery are expected. At larger doses (especially in the case of LSD, DMT, 5-MeO-DMT (5-methoxy-N,N-dimethyltryptamine), or salvinorin-A), the hallucinations tend to modify a subject’s entire reality. Users of DMT or salvinorin-A report having traveled to another world (sometimes curiously referred to as “the real world”) or unknown places (Davis et al., 2018; Maqueda et al., 2015; Timmermann et al., 2018). Thus, the experiences induced by high doses of hallucinogenic drugs should not be seen as mere perceptions of external objects or voices surrounded by an unaffected reality, but rather as powerful hallucinations involving a transformation of the individual’s entire subjective reality and thought patterns through which “reality” is commonly constructed or perceived.

Various hallucinogenic drugs have historically been used since at least the Neolithic period (Samorini, 2019) and by nearly all civilizations worldwide (Guerra-Doce, 2015; Schultes & Hofmann, 1992). The ritual use of these drugs was (and still is) often associated with healing, divinatory, and recreational or spiritual purposes, among others (Luna, 2011; Metzner, 1998). These rituals have played a central role in the traditional medicines of many cultures. These communities consider these

plants to be sacred medicines that are the source of knowledge and cultural identity (Estrada, 1981; Furst, 1976; Narby and Chanchari Pizuri, 2021; La Barre, 1959; Tukano, 2017). Usually the ceremonies in which these medicines are taken involve the entire community. This has translated into psychological and social benefits since social cohesion, feelings of belonging, and cultural and moral values are promoted and reinforced (Cawte, 1985; Dobkin de Rios, 1968; Luna, 1986; Metzner, 2002; Shanon, 2002). In light of this, some authors suggest that the traditional use of hallucinogenic plants must be understood as part of pluralistic medical systems (Apud & Romaní, 2017; Singer & Baer, 2012; Talin & Sanabria, 2017).

Although hallucinogenic drugs have always been used in Western cultures, they were more extensively utilized after the discovery of the psychoactive effects of LSD in 1943. Between the early 1950s and 1970s, various hallucinogenic drugs (mostly LSD and, to a lesser extent, psilocybin and mescaline) were administered to more than 40,000 individuals in experimental and clinical settings. This research made advances in both clinical therapeutics and the fundamental basis of modern psychopharmacology (López-Muñoz & Álamo, 2007).

At the beginning of modern research into hallucinogenic drugs, the hallucinatory effects they produced were conceived of as pathological, so they were named “psychotomimetics” (based on the assumption that they reproduced psychotic states). The presumed pharmacological basis of these symptoms was used as the framework for understanding psychotic states. However, despite this approach, the pharmaceutical company Sandoz sent hundreds of letters and samples of LSD and psilocybin to institutions and universities encouraging its use in psychotherapeutic settings. The induced experience, even when understood as similar to psychosis and producing hallucinations, was not considered pathological but therapeutic (Fig. 1). A recently published report noted the differential nature of hallucinations produced by hallucinogenic drugs versus psychotic states (Leptourgos et al., 2020). Similarly, other research has differentiated between hallucinations in those with or without need of care (Johns et al., 2014). The therapeutic properties of these substances have recently been explored for the treatment of alcoholism, treatment-resistant depression, and anxiety related to life-threatening diseases (Rucker et al., 2018).

The widespread use of these drugs by students, artists, and intellectuals in the counter-/hippie-culture led to their prohibition in 1971 with the appearance of the Convention on Psychotropic Substances (INCB, 1971). LSD, psilocybin, mescaline, MDMA, and other hallucinogens were scheduled as Class I psychotropic substances and considered to be a threat to society and public health. Although these documents recognized hallucinogens as indispensable and did not penalize their use for scientific and experimental purposes, they significantly restricted their availability and completely stopped all ongoing human research due to stigma and difficulties obtaining government subsidies. This situation changed in the early 1990s when various distinguished researchers started the so-called “psychedelic renaissance.” The first researchers to administer classic hallucinogens to healthy volunteers were Leo Hermle and Euphrosyne Gouzoulis-Mayfrank in Germany with oral mescaline (Hermle et al., 1992), Rick Strassman in the United States with intravenous DMT (Strassman, 1996), Franz Vollenweider in Switzerland with oral psilocybin (Vollenweider et al., 1998) and the Catalan

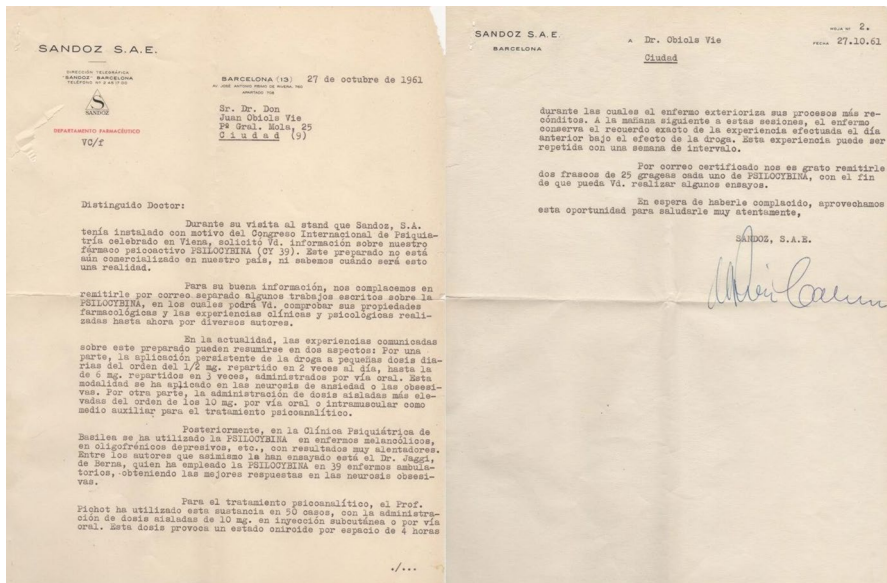


Fig. 1 A letter about the use of psilocybin for therapeutical purposes sent from the pharmaceutical company Sandoz to a Spanish psychiatrist in 1961

pharmacologist Magí Farré performing studies with MDMA and other substances (de la Torre et al., 2000). Around the same time in Brazil, Charles Grob, Dennis McKenna, and Jace Callaway, together with Brazilian researchers Glacus Brito, Edson Neves, and Elizeu Labigalini were the first to investigate the human pharmacology of ayahuasca in ritual users (Grob et al., 1996; Callaway et al., 1999). A few years later, Catalan pharmacologists Jordi Riba and Manel Barbanj were the first to perform placebo-controlled trials involving the administration of oral, freeze-dried ayahuasca to healthy volunteers (Riba et al., 2001).

In this renewed period of research, far from interpreting the effects of these drugs as inherently pathological, further clinical trials assessed their potential medical uses and possible benefits (Bouso et al., 2008; Griffiths et al., 2006; Moreno et al., 2006). During the last 10 to 15 years, several neurobiological studies and therapeutic clinical trials have been published, which demonstrated promising results in understanding the mechanisms of action of hallucinogens and their potential therapeutic uses (Bouso et al., 2021; dos Santos & Hallak, 2020).

Additionally, survey data from thousands of users has shown that they tend to present good mental health (Johansen & Krebs, 2015; Krebs & Johansen, 2013), less psychological distress and suicidality (Hendricks et al., 2015), and less criminal behavior (Hendricks et al., 2018). Participation in traditional ceremonies with hallucinogenic plants like ayahuasca and peyote has also been associated with improvements in physical and psychological health (Barbosa et al., 2012; Bouso et al., 2012; 2015; Halpern et al., 2005; Jiménez-Garrido et al., 2020; Ona et al., 2019). These results also suggest these practices may benefit the whole

community due to the enhancement of social cohesion and the reinforcement of moral and cultural values (Ona et al., 2021; Talin & Sanabria, 2017).

As in the case of NDEs, the use of hallucinogenic drugs can result in serious adverse events, like acute panic attacks or anxiety-like reactions, and exacerbate severe psychiatric disorders like schizophrenia and bipolar disorder (dos Santos et al., 2017; Gómez-Sousa et al., 2021).

The question is not whether the use of classic hallucinogens can be beneficial, but rather how the experiences they generate are compatible with the Western worldview and lifestyle, and how to bridge traditional/Indigenous knowledge with Western science (Bouso and Sánchez-Avilés, 2020; Fotiou, 2020; Massey and Kirk, 2015). Learning from and with Indigenous communities, and using Indigenous research methodologies by scholars represents a step toward understanding the nature of hallucinations and their role in society.

Are There *Bad* Hallucinations?

A question now arises: which hallucinatory experiences can be considered pathological? We will not discuss medical conditions involving physical damage that produce hallucinations, such as macular degeneration, Anton's syndrome, posterior cortical atrophy, migraine, epilepsy, or others. From a clinical point of view, it is generally assumed that pathological mental phenomena are defined by the level of distress and functional impairment they produce. The frequency of recurrence is also indicated by the relevance of symptoms. Regarding hallucinations specifically, it has been suggested that there are two main factors that can turn hallucinations into pathological phenomena and produce short- or long-term negative consequences: (1) social and cultural surroundings, and (2) the interpretation made by the person who is hallucinating.

Regarding social surroundings, it is generally accepted that the degree of dysfunctionality connected to hallucinatory experiences depends on the response to specific contexts and/or the society in which it happens (Larøi et al., 2014; Luhrmann et al., 2015; Parra, 2014). When schizotypal experiences were assessed in psychotic patients comparing people with strong religious beliefs (Christian evangelists) and those without spiritual beliefs, evangelists reported a higher number of positive hallucinatory experiences than the group of psychotic patients. This was related to the interpretation of the experiences, since evangelists attributed their hallucinations to divine intervention (Buckley & Galanter, 1979; Jackson, 1997). Additionally, the context in which these hallucinations take place can either integrate them or make them worse (Parra, 2014). Notably, several negative consequences have been associated with the stigma and pejorative connotations associated with hallucinatory experiences. For example, the fear of being seen as mentally insane is a commonly reported reason for not sharing NDEs or post-bereavement hallucinations, as previously mentioned (Grimby, 1993; Parra, 2014; Rees, 1971; Van Lommel, 2015).

The interpretation/integration made by the subject is also essential. One important aspect to note is that many authors consider the maintenance of “insight” to be a determinant of whether hallucinatory experiences are pathological or not (Berrios,

1996; Goas, 1966; Waters et al., 2012). Thus, hallucinations would be pathological (defined as a psychotic symptom) when the subject does not recognize their non-real nature. This has also to be reconsidered since subjects experiencing hallucinations have different degrees of insight. These insights range from a firm belief in the existence of what is being hallucinated to the full acceptance of the hallucination's internal origin. There are also several intermediate interpretations between these extremes, which depend on the subject's cognitive level, culture, and personality (D'Agostino et al., 2015). Additionally, many exceptions exist where the absence of insight would be desirable. For a surviving spouse, it would be essential to believe in the real nature of the experience in order to receive its consoling effects. For patients receiving hallucinogenic drugs, the value and meaning of the subjective experience would be indispensable for the therapeutic outcome as well.

Even in patients diagnosed with a psychotic disorder, not all hallucinations can be considered negative. For instance, Benjamín (1989) reported a group of chronic schizophrenic patients integrated the voices they heard into their daily lives. They maintained interpersonal relationships with these voices that were adaptive and helpful. Similarly, Miller et al. (1993) reported that some patients with chronic hallucinations reported pleasant voices that could be integrated into their social life. In contrast, in hallucinations associated with first-occurrence psychotic experiences, 80% of them do not persist (Linscott & van Os, 2013). The extensive discussion on the characteristics of hallucinations (content, frequency, or persistence) and their associated consequences is especially relevant in this regard (Escher et al., 2002; Honig et al., 1998). If the content is unpleasant, and/or they are frequent and persistent, they would create anxiety and discomfort. This would eventually form a destructive communication pattern between the subject and their hallucinations.

It might be useful to recall psychologist Julian Jaynes' theory developed in his controversial 1976 publication, *The Origin of Consciousness in the Breakdown of the Bicameral Mind* (Jaynes, 1976). The discussions of his thesis have been pervasive for decades. A simple summary is worth including here. 1) Through the analysis of ancient texts of different cultural origins, the author demonstrated that the concept of mind or consciousness did not exist until approximately 1000 B.C.; 2) Humanity's mental functioning between 10,000 and 1000 B.C. corresponded to what Jaynes called the "bicameral mind," where the left hemisphere of the brain developed speech, as we have known since the nineteenth century, and the right hemisphere developed hallucinations. The auditory hallucinations were deciphered as ancient gods' voices that would guide or order the behavior of our pre-conscious predecessors. 3) About 3,000 years ago in 1000 B.C., humanity learned to develop consciousness as a "learned cultural ability" after some catastrophic natural events and major changes in the character of religions. There would be remnants of the bicameral mind in our times, and schizophrenic auditory hallucinations could be one of those. Jaynes supported his theory with the available knowledge on neuroscience in the 1970s. Recent decades have seen impressive growth in this field that may allow new discussions either for or against Jaynes' hypothesis. Robert Olin (1999) raised the possibility of new neuroimaging techniques contributing to support Jaynes' ideas. He cited a couple of papers that could reinforce Jaynes' assumptions. Lennox et al. (1999) found through neural activity mapping that auditory

hallucinations occurred in various parts of the right hemisphere of a right-handed schizophrenic patient. Similar findings were reported by Dierks et al. (1999), as they proved that primary auditory areas were involved in auditory hallucinations. Sher (2000) later insisted that new neuroimaging techniques could help support Jaynes' theories. Recent revisions of the bicameral mind theory have updated its contributions to neuroscience (Cavana et al., 2007). It remains a heuristic concept in evolutionary biology (Vallortigara & Rogers, 2020). Jaynes' contribution to the theory of consciousness supports our proposal regarding how hallucinations should be considered, since it suggests that hallucinations are part of our nature and not a sign of psychopathology or dysfunction.

Final Remarks: Hallucinations as the *via Regia* to Knowledge

Hallucinations have been defined as “perception without object” since the time of Esquirol. Perceptions occur without the mediation of the senses and are distinguishable from illusions, where the object does exist but the perception is distorted. However, the relationship between reality and perception is not univocal. For instance, it is estimated that only 20% of the awareness of the visual process comes from the senses (bottom-up), while the rest is constructed *inside* the brain (top-down), where there are no objects (Maturana & Varela, 2009). Thus, the brain uses prediction models in order to build an eventual perception of reality. It has been demonstrated that cognitive processes and cultural factors are not only able to enhance the bottom-up inputs but also to modulate them (Powers et al., 2016). Thus, if there is no univocal relationship between reality and perception, and the act of knowing comes mainly from a place without objects (the brain), then everyday perception would be considered a hallucination (Alonso, 2020). By this way, all reality could be understood as symbolically mediated. Perceiving without an object or mediation of the senses, is quite common. It usually happens in dreams and is the basis of the creative imagination. However, the imaginative process has attracted less attention. As previously mentioned, perception also happens while people are awake without the physical presence of an object. Imagination could then be defined as a kind of hallucination, although no one would say that imagination is a symptom of psychopathology. Depending on the content and the framework where it takes place, imagination may be a sign of psychopathology (e.g., ruminations), psychological health (e.g., making plans for the future), or acquiring knowledge from reality (e.g., ritual use of hallucinogenic plants). Newton, Einstein, and many others, despite having privileged minds, made discoveries not through empirical research but by using their imaginations. The structure of the benzene was visualized by August Kekulé during a dream. The PCR (polymerase chain reaction) technique, known today because of the COVID-19 pandemic, was conceived of by the biochemist Kari Mullis (who would be given the Nobel laureate for it) under the influence of LSD (Mullis, 2000).

Knowledge may be better obtained not from outside, through the mediation of the senses, but from within thought because the information we receive from our senses is processed by the thought through cultural models. Thought combines sense

information with memories, combines different thoughts, uses thoughts to construct causal models not apparent in the senses alone, etc.

Like imagination, hallucinations can be stormy and dysfunctional when part of a psychopathological disease. But they can also be therapeutic, adaptive, a source of creativity, joy, fulfillment, and knowledge. Hallucinations may also produce ontologically *real* experiences by not using the senses to capture reality. Hallucinations can then be considered a source of knowledge. This is how traditional cultures have worked with visions, dreams, and hallucinations for millennia (Black-Elk, 2016). This could be one of the reasons to support the modern use of hallucinogenic drugs in psychiatry: because they can produce healing transformation through an enhanced knowledge of the subjects' reality. This enhanced knowledge is actually manifested in some of the reports shared by people who have been exposed to hallucinogenic drugs: "I had the opportunity of observing me from a completely new perspective" (Grof, 2005). In recent qualitative studies of therapy assisted by hallucinogens, patients' reports include descriptions like "me revealing myself, like actually showing myself to the world. This is who I am, this is who I really am" (Noorani et al., 2018). To summarize, hallucinations allow access to a symbolic reality that is obscured when it is presumed to be a distortion of the senses rather than an internal source of information.

There is further evidence from neuroscientific research that supports this claim. When imagining pictures under the effects of ayahuasca, primary visual areas showed the same activation as real vision did, as well as in the network involved with vision, memory, and intention. This led researchers to conclude that "by boosting the intensity of recalled images to the same level of natural image, ayahuasca lends a status of reality to inner experiences" (de Araujo et al., 2012). In another ayahuasca study using SPECT, Riba et al. (2006) found no increases in blood perfusion in visual areas after administering a dose of ayahuasca that induced robust effects in cognitive and visual subjective measures. Thus, without a clear indication of imagining pictures or the conscious intention of *seeing*, visual areas of the brain can remain inactive even in the presence of visual phenomena. This shows how the process of vision and its associated knowledge can be independent from the processing of information delivered through the senses. It is worth noting that some authors have suggested theories regarding the source of knowledge that hallucinations represent by shamans (Rock & Krippner, 2011). Although the lack of experimental data on that regard, this has epistemological implications that should not be omitted, as hallucinations would not be conceived of as mere illusions of non-real content, but as a potential source of knowledge and meaning.

Finally, our arguments have legal implications that should be addressed. Hallucinogens are Schedule I substances in the Convention on Psychotropic Substances of 1971, not because their harmful effects to subjects and/or society were carefully and scientifically determined, but because they have "the capacity to produce [...] central nervous system stimulation or depression, resulting in hallucinations or disturbances in motor function or thinking or behaviour or perception or mood" (INCB, 1971: 9). Hallucinogens are Schedule I substances because they are believed to be harmful for public health, present high risk for abuse, have no medical value and, according to the 1971 Convention also because they induce hallucinations. If hallucinations are

not pathological, and we acknowledge that they have demonstrated a low abuse risk and beneficial therapeutic properties, the legal status of these hallucinogenic plants and substances as Schedule I drugs should be reevaluated from a drug policy and public health perspective (dos Santos et al., 2021).

Conclusion

Throughout this paper, we have explored how the beginnings of Western research around hallucinations became polarized between those who postulated the psychological origins of hallucinations and those who defended sensory theories. Ultimately, the latter prevailed. This approach, along with the nosology proposed by Kraepelin, paved the way for a subsequent pathological view of hallucinations within psychiatry. While different explanatory models of hallucinations appeared, a significant amount of anthropological evidence reviewed in this manuscript showed the transcultural realities surrounding the hallucinatory phenomena. This evidence calls for an eventual “decolonizing of hallucinations,” as their conceptualization originated mainly in Western culture, while a complex myriad of relationships with hallucinogens existed in other cultures. Furthermore, epidemiological evidence has found the presence of hallucinations among the general population, suggesting they are more “normal” than previously thought. Examples such as grief hallucinations or the use of hallucinogenic drugs have been described in detail. Regarding the use of hallucinogens, we have seen that the induction of powerful hallucinations can result in mental health benefits.

We propose that the term “hallucination” be respected, as well as the category “hallucinogens” when referring to drugs like LSD, DMT, ayahuasca, and psilocybin. Both terms should be used in the literature without pejorative connotations or pathology-associated views. “Hallucinogen” can be a neutral term that describes a phenomenon producing both positive and negative experiences and outcomes. Further research developed from this manuscript could be a deep analysis to decolonize the term “hallucinations.” According to our experience in the field, “hallucinogens” is not an acceptable term for Indigenous spiritual practitioners that use psychoactive plants in the context of their traditional medicines.

It is possible that new concepts to replace “hallucination” are needed, but this can only be done in collaboration with Indigenous people in a symmetrical dialogue. This is an obligatory task that has yet to be developed. According to Horváth et al. (2017), psychedelic and other phenomena with visual connotations, often called hallucinations, may involve the activation of a representational system that provides visual integration of cognitive processes. This visual system is supposed to be involved in visions, hallucinations, daydreams, etc. It is speculated to involve a pre-language visual form of expressive thought that functions to solve problems by using image schemas that represent basic structures of sensorimotor experience (Lohmar, 2016; Winkelman, 2010). This perspective of a visual symbolic information system has a long intellectual history and may provides a robust ability to explain central features of psychedelic experiences characterized as hallucinations, especially human-like entities (Winkelman, 2010; 2018). It would be of interest to

experimentally test such models, which also propose to rename them as “vision” rather than hallucinations, even though they ignore the fact that hallucinations are not necessarily visual in nature.

Finally, we have seen that the pathological view of hallucinations no longer makes sense given the unclear relationship between reality and perception. This is the reason that we can cultivate our argument and suggest that hallucinations can also be a source of knowledge. This would indeed be via the traditional, contemporary, and most effective method to induce hallucinations: through ingesting hallucinogens.

Considering hallucinations not simply as a psychopathological symptom, but also as a source of healing and knowledge, could decrease the stigmatization of people experiencing them and, thus, the associated suffering.

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