

# Primary States of Consciousness: A Review of Historical and Contemporary Developments

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**Abstract:** In psychiatry, primary states are conceived as phylogenetically older states of consciousness as compared to secondary states governed by sociocultural inhibition. The historical development of the concept is reviewed, along with its relationship to theories of consciousness. We suggest that primary states of consciousness are characterized by a merging of emotion, communication, and action (ACE fusion), and a temporary breakdown of self-control. Furthermore, we examine the neurobiological basis of this model, including its relation to the phenomenon of neural dedifferentiation, the loss of modularity during altered states of consciousness, and increased corticostriatal connectivity. By shedding light on the importance of primary states, this article provides a novel perspective on the role of consciousness as a mechanism of differentiation and control. A better understanding of the neural mechanisms underlying primary states of consciousness could have significant implications for the treatment of psychiatric disorders and the development of novel therapeutic interventions.

**Keywords:** primary states, consciousness, psychedelics, psychotherapy, arousal function, psychotomimetic drugs, psychosis, dreams, hypnotic trance.

## 1. Introduction

Consciousness in human adults, and how it differs from that of other animals, has been a longstanding and ongoing topic of debate within the brain and mind sciences. Historically, this differentiation has been defined by the dichotomy between primary (or archaic) and secondary (or cultural) states of consciousness, as discussed by several prominent researchers including Denton (2006), Edelman (2003), Hobson (2011), and Panksepp (2005). While the dichotomy dates back to the earliest days of psychological science and psychiatry (Kokoszka 2007), remarkably little is known about the induction

and control of primary states in laboratory settings (but see (Panksepp 2005; Holt 2002, 2008; Robbins 2018)). This article is meant to fill this gap by providing a review of the historical and more recent developments on the topic and derive a set of testable, neurobiologically plausible working hypotheses.

Primary states of consciousness, also referred to as primal or core emotions, are thought to be phylogenetically older and more basic forms of consciousness present in non-human species (Panksepp 2005; Holt 2002, 2008; Robbins 2018). Primary states are associated with homeostatic and innate patterns of behaviors crucial to the regulation and preservation of life (D. Denton 2006). Secondary states of consciousness are more complex and thought to be unique to the human adult. They are dependent on complex hierarchical information processing (Goekoop and de Kleijn 2021) and broadly characterized by executive control, the ability to reflect on one's own thoughts and experiences (a.k.a., metacognition), to actively remember and entertain past states and plan for complex, abstract future goals (e.g., getting an education) generalizing across a wide range of contexts (e.g., career, social life, health, personal fulfillment). Our primary focus is to investigate the occurrence of primary states of consciousness in humans, and the potential implications of these states on cognition and behavior. Rather than discussing the unique characteristics of human secondary states of consciousness, our aim is to delve into the nature and manifestation of primary states, which have received comparatively little scientific attention.

The notion of consciousness is ambiguous, with some theorists wondering whether nonhuman animals even enjoy subjective experience at all (Birch 2022). Here, we set asides the latter question of phenomenal consciousness (i.e., “what it feels like to be aware of something”) to focus on the question of access consciousness (i.e., the ability to use information in a flexible and adaptive way, to integrate it with other information and to act upon it) (Block 1992). We assume a view of consciousness as a basic biologic imperative of adaptation and control (Maturana 1990; Baars 1997; Mansell 2022; Mayr 2004). According to this view, the brain is constantly receiving sensory input and generating motor output in order to maintain homeostasis and achieve desired goals (Powers 2009; Friston, Samothrakis, and Montague 2012). Differentiation of the various

components of this system allows for finer control over the output, as different neural circuits can be activated or inhibited to achieve specific outcomes. Flexible and adaptive control over behavior leads to the growth of a hierarchy of goals and purpose (L. Perlovsky and Schoeller 2019). These include internal (self), external (social) and overarching (normative) models, all susceptible to collapse under extreme stress, psychedelic intake, or psychotherapeutic work—see respectively (Goekoop and de Kleijn 2021), (Chris Letheby 2021) and (Higginson, Mansell, and Wood 2011). Numerous schools of thought in psychotherapy, including but not restricted to psychodynamic psychology, assume that the mismatch between biologic and cultural imperatives gives rise to psychopathology (Micale 2014; Kokoszka 2007; Henri F. Ellenberger 1970). While most research in adult psychology focuses on secondary states of consciousness and assume executive control in healthy subjects, there is growing interest in recent years in the importance of primary states (Carhart-Harris and Friston 2019; Chris Letheby and Gerrans 2017; C. Letheby 2015) with increasing evidence suggesting that their effective regulation may be crucial to foster long-lasting behavioral change in clinical settings (Preller and Vollenweider 2018).

As with many models in science, initial distinctions may start as vague and imprecise, to become increasingly refined and nuanced with research and experience, ideally leading to mathematical formulae. Here, we tentatively suggest a distinction between strong and weak forms of primary states (respectively reviewed in sections 3 and 4), differing in frequency, intensity and duration (see table 1). Strong primary states include but are not limited to acute psychotic decompensation, dreams, and religious experiences. These states are often characterized by a loss of arousal function and a heightened focus on concurrent sensations. In comparison, we present states such as meditation, regression, and daydreaming as milder forms of primary states. This distinction is preliminary and vague and, as our understanding of primary states of consciousness advances, more precise distinctions between weak and strong primary states, should draw on findings across neurobiology, cognition and phenomenology.

**Table 1:** Tentative distinction between strong and weak forms of primary states (PS). Strong forms of primary states occur with low frequency, but high intensity and long duration, while weak forms have a higher frequency but lower intensity and duration.

	<b>Weak PS</b>	<b>Strong PS</b>
<b>Frequency</b>	++ (e.g., transient psychosis)	-- (e.g., decompensation episode)
<b>Intensity</b>	-- (e.g., daydreaming)	++ (e.g., dream)
<b>Duration</b>	-- (e.g., absorption)	++ (e.g., creative illness)

## 2. Primary states of consciousness

### 2.1. The notion of primary states

The notion of a primary state of consciousness was introduced to distinguish a special type of human consciousness that is reminiscent of phylogenetically older forms of cognitive organization (D. Denton 2006; D. A. Denton et al. 2009; A. Hobson and Voss 2011; Samuels 2019). The idea of primary, archaic states of consciousness has a long history in psychiatry, with many theorists proposing that mental illnesses may be a result of a regression to these early states. Hughlings Jackson proposed that the pathophysiology of the nervous system could be seen as a form of dissolution, or a reverse of evolution (Hughlings Jackson 1887). He believed that patients with nervous system dissolution would display symptoms that were less evolved compared to those seen in healthy subjects. Such symptoms would be less complex, less specialized, and less voluntary. This idea was picked up by Silvano Arieti for whom schizophrenia is caused by the global dissolution of consciousness or the higher functions that ensure personality integration (Arieti 1955). Freud also developed this concept of dissolution further into the idea of regression, which became the foundation for the theory of psychoanalysis (Bar-Haim 2014). Freud used the concept of regression to explain the nature and logic of dreams, where elements of perception are triggered by memory rather than by stimuli in an arousal condition (Freud 1983). Similarly, Bleuler's model of schizophrenia centers around alogia, a phenomenon in which the logical thought

processes of an individual weaken, causing emotions and affective experiences to become more prominent and dominate the associations within their thinking processes, resulting in a reduced ability to communicate effectively, as well as difficulty in expressing one's thoughts and feelings (Bleuler and Brill 1924).

When reviewing the more recent literature, the notion of primary states of consciousness is alternatively used to encompass a wide range of phenomena including the behavior of pre-verbal children (Caprara et al. 1986), the delusions of psychotic patients (Brosin 2007), the organization of dreams (Kuiken 2010; A. Hobson and Voss 2011), or the experience induced by psychotomimetic drugs or hallucinogens (Carhart-Harris and Friston 2019). In the context of psychedelic research, primary states have been explored under notions such as emotional breakthrough (Roseman et al. 2019) and ego dissolution (Stoliker et al. 2022). Primary states are also associated to psychological insight in psychotherapy (Hayward 1961; Roseman et al. 2019), extraordinary sexual experiences (Stoléru 2014; Adam Safron 2016), or family crises (Barcai 1974). Note that the induction of primary states of consciousness can take a social dimension. According to (N. M. Hobson et al. 2018), practices aimed at inducing altered states of consciousness, such as trance states, are frequently utilized in social settings as a means of regulating emotions, a phenomenon extensively studied empirically by Bernard Rimé and colleagues (Delfosse et al. 2004). Durkheim described the phenomenon of collective effervescence, a sense of heightened collective emotion and shared experience (Rimé and Páez 2023). Collective effervescence is reminiscent of the antic notion of "enthusiasm" (*ένθουσιασμός*), in the words of philosopher and historian Isaac Taylor "a blending of animal and intellectual abilities" (Taylor 1829).

Within psychiatry, some authors argue that primary states derive from the collapse of the subject's inhibition and a loss of one's sense of reality (Terr et al. 2005; Ratcliffe 2008), which has been compared to the phenomenon of ego-dissolution during psychedelic consumption (Carhart-Harris and Friston 2019) and its associated increase in global brain connectivity (Tagliazucchi et al. 2016). In this context, the notion of reality testing becomes an essential distinction between primary and secondary states (Hurvich 1970; Bentall, Baker, and Havers 1991). According to (Erika Fromm 1976), "cognitive

modes and organization range on a continuum from drive-dominated primary process to the reality-oriented secondary process. Primary process [...] denotes thinking in images, not in words and logical concepts. When it occurs spontaneously in the adult, it represents an input from the unconscious that transcends waking logic and ordinary modes of thought." Clearly, dreams, psychotic episodes, family crises, and religious or mystical experiences are markedly distinct from, and sometimes even contradictory to, the demands and expectations of everyday life. The occurrence of altered, primary states of consciousness can create conflicts between biological and sociocultural norms. This can be particularly true in cases of acute episodic psychophysiological decompensation, where physical and psychological symptoms become impossible to reconcile with social expectations (Barcai, 1972, 1974). The occurrence of primary states in adults is a rare and extraordinary event, usually reprimanded, inhibited, or simply forbidden by law. If they are to be authorized, it is only under special conditions with considerable time and energy costs (Tonna, Marchesi, and Parmigiani 2019). In premodern societies, primary states are often carefully organized and integrated into cultural practices, such as shamanic rituals, where they are considered to perform essential psychosocial functions (Gay et al. 1980).

The executive control characteristic of secondary states of consciousness comes at a cost, and the inhibition of biological drives for the purpose of long-term planning (i.e., constrained cognition) requires constant attentional resources and considerable energy expenditures. As recognized by ethologists, human culture engenders increasingly complex patterns of feeding, drinking, sleeping, and reproduction that extend these homeostatic drives (Tonna, Marchesi, and Parmigiani 2019). These patterns do not appear solely driven by biological imperatives, but instead follow their own logic. In many cases, this logic contradicts or interferes with immediate biological requirements, resulting in behaviors that are seemingly counterintuitive from a purely physiological perspective. Since the turn of the 20th century, a fundamental principle of psychological theory has been that as complex human culture emerged, conflicts arose between cultural norms and biological needs related to survival and reproduction (such as obtaining food, water, sex, sleep, and warmth). Thus humans can delay short-term (individual) needs for long-term (collective) plans, and hierarchical information

processing is thought to be an essential dimension of the gradual adaptation to a wider range of reality than immediately available to the senses. As mentioned in the introduction, numerous schools in psychotherapies are founded on the notion that psychopathology stems from a failure to accommodate such contradictions (see (A. Safran 2021)), allowing the individual to strive as a biological creature while observing the needs of the collective—i.e., reality testing (Keller 2002; Mills 2022). To compensate for the contradictions between biological and cultural imperatives a number of inhibitions, or defense mechanisms, develop spontaneously to ensure the survival of the individual while still enabling collective cultural progress (Scheepers et al. 2018). Some authors conceive psychosis as a catastrophic breakdown of such compensatory mechanisms (Marcus 2017). This insight parallels the psychiatric observation of psychotic patients and the resurgence in some subset of patients of biological obsessions concerning vital functions of sex (Dell'osso et al. 2012), food (Kouidrat et al. 2014), or hygiene (Tallis 1996; Stanley, Turner, and Borden 1990)<sup>1</sup>. As Jackson, Arieti, and Freud's early work on regression suggests, psychotic patients often behave like preverbal children incapable to differentiate emotion, language, and behavior, a phenomenon sometimes referred to as pathologic regression (Muller 1963), which, interestingly, may be exploited for therapeutic purposes (Yazaki 1992). This phenomenon can be loosely compared to the thought-action fusion in the etiology of obsessive intrusions (Eric Rassin et al. 1999; E. Rassin and Koster 2003), both associated to aberrant corticostriatal functional connectivity (Harrison et al. 2009; Lee et al. 2022; Whitfield-Gabrieli et al. 2009).

Beyond psychiatry, the notion of primary states has also been explored and debated from a neurobiologic perspective by several prominent researchers, including Gerald Edelman, Jaak Panksepp, Joseph LeDoux, Antonio Damasio, and others. The neurobiologic perspective highlights the integration of sensory information, motor output, and attentional processes, as well as the integration of neural signals across the brain— a.k.a., "increased global connectivity" (Tagliazucchi et al. 2016) and "hyperconnectivity" (Whitfield-Gabrieli et al. 2009). Gerald Edelman proposed the theory of neuronal group

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<sup>1</sup> Note that the DSM does not consider obsessive symptoms part of the psychotic spectrum.

selection, which suggests that the brain's activity is organized into functional groups of neurons that are selected for their ability to perform specific tasks. He argued that consciousness arises from the dynamic interactions between these neuronal clusters. According to Edelman, a primary state of consciousness is the result of the integration of sensory information, motor output, and attentional processes (Edelman 2003). More recent adjacent trends include the work of Anil Seth and Tim Bayne, who proposed that consciousness arises from the integration of neural signals across the brain (Seth and Bayne 2022; Bayne, Seth, and Massimini 2020). In this context, primary state of consciousness would be related to the brain's ability to integrate neural signals in generating a unified experience of the world.

Another line of research focuses specifically on emotional processes and a dialogue between cortical and subcortical brain regions. Jaak Panksepp discussed in length the notion of core emotional feelings (Panksepp 2005). He argued that the emotional system is rooted in subcortical structures, such as the amygdala, and that consciousness arises from the interaction between these structures and the neocortex. LeDoux and Brown also view emotions as the primary driver of consciousness and argued that conscious experience arises from the corticostriatal interactions (LeDoux and Brown 2017). Antonio Damasio proposed the somatic marker hypothesis, which suggests that emotions are the result of the body's feedback to the brain (Damasio 1996). This is particularly evident in psychedelic states, where bodily sensations and feelings are often amplified and distorted. In these states, the boundary between self and world can become blurred, leading to a profound sense of interconnectedness and unity (Stoliker et al. 2022). The binding of interoceptive and exteroceptive signal is now a whole research program of its own (Chen et al. 2021), with a multitude of applications for psychopathology (Khalsa et al. 2018; F. Schoeller et al. 2019; Riva et al. 2021). Other researchers, such as Georg Northoff and Victor Lamme, also emphasized the interaction between subcortical and cortical structures, arguing that consciousness is related to the activation of the thalamic and the brainstem networks and their interaction with the neocortex (Northoff and Lamme 2020), reminiscent of the Dendritic Integration Theory of

Consciousness (Aru et al. 2023; Bachmann, Suzuki, and Aru 2020, n.d.) also emphasizing the role of the thalamo-cortical interactions.

The extensive range of these observations, spanning across psychology, psychiatry, neurophysiology, and the social sciences, highlights the pressing need for deeper comprehension of primary states and their possible impact on cognition and behavior. In this context, we suggest that some insights of Leonid Perlovsky are particularly relevant (L. Perlovsky 2016; L. I. Perlovsky 2007). Drawing from mathematical models of learning in the context of automatic target recognition, Perlovsky suggested a view of consciousness as an evolutionary process of differentiation and synthesis (L. Perlovsky 2016; L. Perlovsky and Schoeller 2019; Félix Schoeller, Perlovsky, and Arseniev 2018). In this model, fundamental brain functions (e.g., emotion, communication, and action), work in a coordinated fashion to produce complex behaviors (Félix Schoeller, Perlovsky, and Arseniev 2018). In engineering terms, these modules can be thought of as distinct subsystems with unique inputs, processing mechanisms, and outputs, that are integrated into a larger system to produce a specific behavior. Here, the biologic function of human consciousness is to allow for the coordination and integration of these subsystems in a flexible and adaptive manner, leading to the generation of novel and context-dependent behaviors. Flexibility arises from the ability of the system to dynamically adjust weights and connections between different modules, allowing for the emergence of novel behavioral patterns in response to changing environmental demands.

An example of primary, undifferentiated state of consciousness that is familiar to hunters is the flight response of the deer: when frightened (i.e., emotion), the deer will immediately run away (i.e., action) and use a range of vocalizations, such as snorts, grunts, or bleats (i.e., communication), to alert the rest of the herd, a phenomenon known as acute physical crisis and a function of the animal's vigilance (Clinchy, Sheriff, and Zanette 2013)—note that predator vigilance is inversely proportional to group size (Elgar 1989). Similarly, when a dog is overly excited (i.e., emotion), it may wag its tail (i.e., action) and emit barks, growls, or whines (i.e., communication) to convey its state to other dogs or its owner. Perhaps another demonstration of the merger of emotion, communication,

and action would be the phenomenon of bluff and intimidation displays in chimpanzees (Hosaka 2015). Here, primary states are characterized by a fusion of action, communication, and emotion processes (ACE).

In contrast to the ACE fusion ordinarily observable in other animals, humans possess a unique ability to exert fine grained control over each module independently of the others (L. Perlovsky 2016; L. I. Perlovsky 2007). For instance, when experiencing fear, humans can exhibit the physical manifestations of the emotion without necessarily engaging in the corresponding behavior (figure 1). Human adults can use language to communicate their feelings of fear without necessarily entering a state of panic. An individual may appear calm and composed while performing a task despite their internal feelings of fear. While some theorists such as Edelman propose that secondary states are dependent on language and the ability to think symbolically, enabling humans to create and transmit cultural beliefs, practices, and values (Edelman 2003), the present model suggests that paralinguistic cues are an integral aspect of primary states.

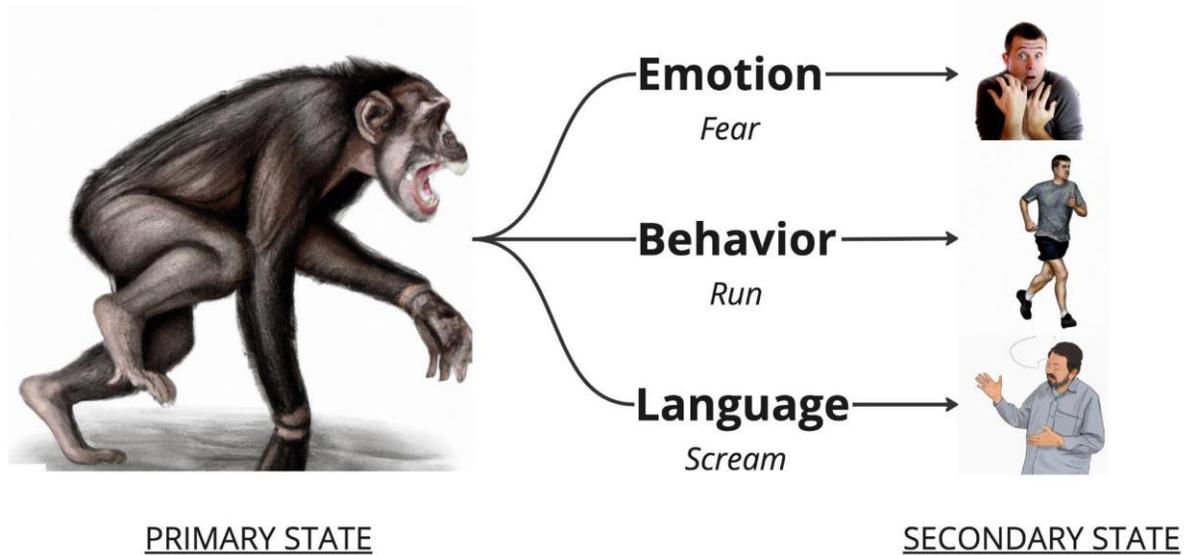
Perlovsky's model—reminiscent of Jackson's—may be slightly simplistic given the wealth of data now available about animal consciousness and planning<sup>2</sup>. However, there does seem to be relative difference in voluntary control between humans and the rest of the living world, usually encapsulated under the notions of cognitive flexibility and emotional regulation<sup>3</sup>—two essential skills taught in psychiatric care to help patients manage symptoms. At least some resistance to the most disturbing and violent forms of biological behavior are necessary conditions for the emergence of human culture and advanced forms of social organization (Lorenz 1963; Erich Fromm 1973). Secondary states of consciousness, or ACE differentiation and its characteristic self-control thereby

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<sup>2</sup> E.g., there is much evidence that nonhuman animals can engage in sophisticated long-term planning (e.g.,(Osvath and Martin-Ordas 2014)). Domesticated animals seem to show some degree of differentiation (e.g., dogs can quiver in fear, but not run away). Rich behaviors, sophisticated learning and memory faculties are present in in cephalopod mollusks such as the octopus (Edelman and Seth, 2009), while birds display working memory, social learning, planning, and problem solving (Pepperberg, 2006; Salwiczek et al., 2010). Famously, bees can waggle dance to communicate to other bees the location of flowers but these are exceptions rather than the rule.

<sup>3</sup> Note that in humans, emotion regulation generally does not mean suppressing the emotion—though active suppression is a form of emotional regulation (e.g., Ohira et al., 2006; Gross, 2002)—but ideally learning to exert control over the associated bodily response and following strategies to limit distress (Price and Hooven 2018).

allow for action and cooperation on a wider time scale than what is immediately available to the senses, elevating the realm of experience beyond the immediate needs of the organism. In other words, there is a time and place to eat, sleep, fight, mate, and defecate, and to think otherwise is the hallmark of insanity, children, or dreamers.



**Figure 1:** Primary states are characterized by the fusion of action, emotion, and communication patterns. With the emergence of secondary states of consciousness and prefrontal retro-control, humans gain the ability to exert independent control over these three distinct modules. Here ACE fusion is illustrated by a chimpanzee simultaneously scared (emotion), running away (action) while alerting surrounding mates (communication). Humans, on the other hand, can experience fear without acting on it, simulate emotions without feeling them, and express emotions without engaging in the corresponding behavior.

### 3. Strong forms of primary states and their inducers

Primary states of consciousness, such as psychosis, dreams, and psychedelic experiences, have long been of interest to psychologists and researchers due to their potential to provide insight into an individual's subconscious cognitive and emotional processes, and to facilitate positive changes in behavior and emotional states. Building upon this general idea, we propose a working hypothesis that primary states are characterized by a merging of action, communication, and emotion (ACE fusion), and a temporary breakdown of self-control (commonly referred in meditation practices or psychedelic-assisted psychotherapy as “surrendering”, “letting go”, or “non-attachment”).

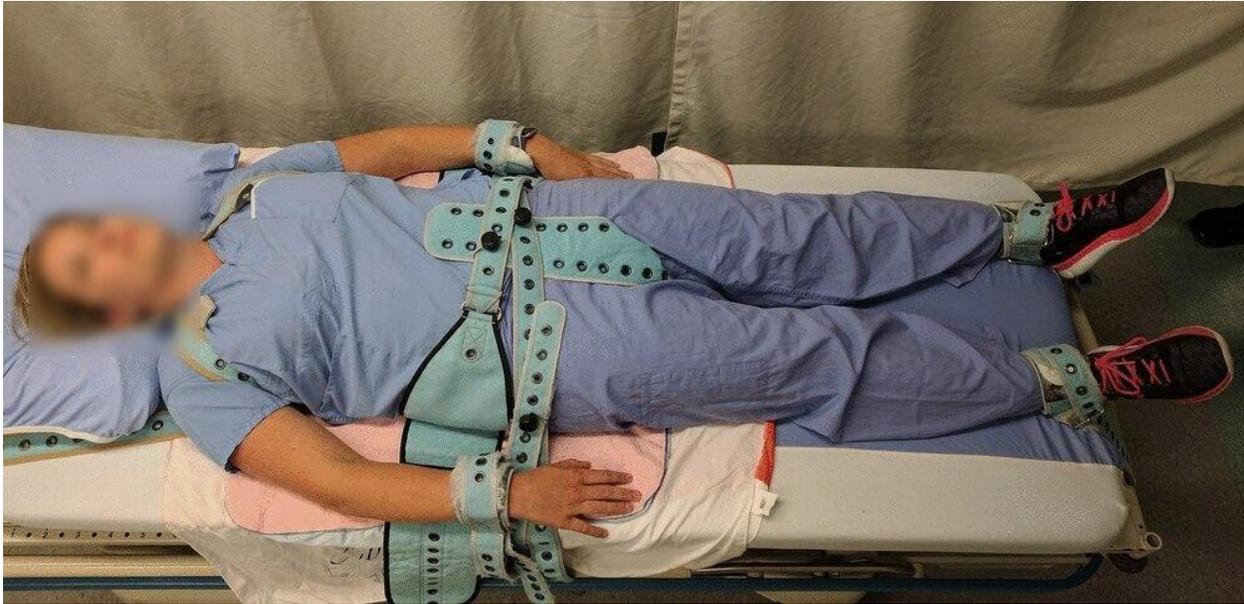
Neurobiologically, ACE fusion or loss of modularity between emotion, expression, and action in primary states of consciousness may involve alterations in brain regions and circuits involved in emotion processing, motor control, and language. In the final section, we discuss the relationship between ACE fusion and changes in brain connectivity (Carhart-Harris et al., 2014; Tagliazucchi et al., 2014).

As briefly described in the introduction, instead of presenting a simplistic dichotomy between primary and secondary states, we will tentatively define them along a multidimensional continuum, with gradient along each dimensions. We distinguish between weak and strong forms of primary states of consciousness (respectively section 3 and 4), where both differ in frequency, duration, and intensity. Weak primary states involve a lesser degree of emotion-language-action fusion, as well as a greater susceptibility to self-control. Strong primary states such as acute decompensation or psychedelic breakthrough are less frequent, more intense, and typically show long-lasting effects on brain and behavior. Increasing evidence points to the transformative potential of primary states of consciousness in facilitating profound personal insights. However, the effects of these states can be equally distressing and disruptive, potentially leading to significant disruptions in an individual's life. A more comprehensive understanding of the underlying structure and function of primary states may aid in the development of effective interventions that maximize therapeutic benefits while minimizing the associated risks.

### **3.1. Psychosis**

Psychosis is a mental health condition that is characterized by a loss of contact with reality, often resulting in delusions, hallucinations, and other symptoms (Adams et al. 2013; Broome et al. 2005). In the words of the controversial JN Rosen, "Psychosis is an interminable nightmare" (Rosen 1947). As discussed briefly in the previous section, a model of psychosis characterizes it as a catastrophic breakdown of the secondary defenses that typically safeguard individuals from overwhelming or disturbing thoughts and experiences (Buckley 1988). Secondary defenses are psychological mechanisms that we use to cope with stress and distress (Hentschel et al. 2012). They are more

complex and sophisticated than primary defenses, which are automatic, unconscious responses to danger or threat (e.g., fight, flight, freeze, fawn, or dissociation). Secondary defenses involve conscious, intentional efforts to manage or regulate thoughts, emotions, and behaviors. These include repression, denial, projection, rationalization, and other coping strategies to maintain a sense of control and stability (Cramer 2006). Under excessive stress, secondary defenses may become overwhelmed or impaired, leading to a catastrophic breakdown (Barcai 1972). This can occur when an individual is faced with a situation or experience that is too distressing or overwhelming for their existing coping mechanisms to handle. The result is a loss of control and a breakdown of the individual's ability to maintain a coherent, rational view of the world, usually manifesting in stereotypical autonomic fight/flight responses (e.g., aggression, startle, freeze responses). Psychotic breakdown also reflects in speech aberrations, which are frequent in psychosis (Minor et al. 2019), as well as disorganization of mood (Boks et al. 2007), and other characteristic symptoms such as hallucinations and delusions (Moreira, 2015; Meloy, 1986). ACE fusion in psychosis is perhaps most obvious in the case of violent psychotic episodes in intensive psychiatric care, which may require isolation of the patient in confinement and lead to the use of physical restraint by means of a straightjacket (figure 2) for the episode duration (Chieze et al. 2019). Psychotic episodes typically occur in conditions such as schizophrenia or bipolar disorder, caused by a combination of genetic, environmental, and psychological factors. They can be triggered by a number of environmental factors, including stress, substance abuse, or medications. Other factors that may contribute to the development of a psychotic episode include a personal history of trauma or abuse, and extreme sleep deprivation or prolonged exposure to high levels of sensory stimulation.



**Figure 2:** During psychotic episodes, a person may experience a loss of connection with reality, which can manifest in a variety of symptoms, including hallucinations, delusions, and disorganized thinking and behavior. The fusion of emotion, language, and action characteristic of the most severe psychotic episodes may require physical restraint and the use of major tranquilizers (neuroleptics).

### 3.2. Psychedelic experiences

Psychedelics are a class of psychoactive drugs that are known for their ability to alter consciousness and produce significant changes in perception, mood, and cognitive processes (Stoliker et al. 2022; Wolff et al. 2020; Preller and Vollenweider 2018). These psychotomimetic effects (meaning they mimic psychosis) are believed to be mediated by the drug's interactions with the serotonin receptor system in the brain (Malcolm and Thomas 2022), which plays a key role in regulating mood (Young and Leyton 2002), perception (Harmer et al. 2004), and cognition (Zhang and Stackman 2015). Since the early experimentations on psychotomimetic compounds, and their relevance in allowing scientists to explore first-hand psychosis under controlled conditions, these drugs have been used in psychiatric and psychological research to study the effects of primary states on cognition, emotion, and behavior. The unique effects of these drugs include altered perceptions (hallucination), changes in mood (dysphoria), and a sense of openness and transcendence (Preller and Vollenweider 2018). However, unlike other primary states, such as those induced by psychosis or dreams, the effects of psychedelics can be relatively controlled and regulated through the use of specific doses and administration

protocols. During the psychedelic experiences, patients are typically incapacitated, lying still in a bed with eye shades under the surveillance of two therapists. As mentioned previously, the breakdown of defenses during the psychedelic experience may lead to what has been called emotional breakthroughs (Roseman et al. 2019) and psychological insight (Davis et al. 2021). Notably, emotions and brain function can be altered for up to one month after a single high dose (Barrett et al. 2020).

### **3.3. Creative illness**

The deep creative process, also known as creative illness, is a term used to describe the intense mental and emotional state that some creative individuals may experience while they are engaged in the process of creating something new (H. F. Ellenberger 1968). This state is often associated with a heightened level of emotional intensity and a deep focus on the task at hand, which can be similar to the experience of a psychotic breakdown or a manic episode in bipolar disorder. In both cases, the person may become deeply absorbed in their thoughts and experiences and experience difficulty distinguishing between what is real and what is not. In the words of Brahms, “I am in a trance-like condition – hovering between being asleep and awake; I am still conscious but right on the border of losing consciousness and it is at such moments that inspired ideas come” (Abell 2016). As Henri Ellenberger puts it (1970): “A creative illness succeeds in a period of intense preoccupation with an idea and search for a certain truth. It is a polymorphous condition that can take the shape of depression, neurosis, psychosomatic ailments, or even psychosis. Whatever the symptoms, they are felt as painful, if not agonizing, by the subject, with alternating periods of alleviation and worsening. Throughout the illness, the subject never loses the thread of his dominating preoccupation. It is often incompatible with normal professional activity and family life. The subject is almost entirely absorbed with himself. He suffers from feelings of utter isolation. The subject emerges from his ordeal with a permanent transformation in his personality and the conviction that he has discovered a great truth or a new spiritual world”. A full examination of the relationship between creativity and psychosis can be found in Anthony Storr’s admirable *Dynamics of Creation* (Storr 1991). Perhaps, a

psychiatric parallel for creative illness is hypomanic episode, a milder form of mania, which is characterized by elevated or irritable mood, energy, and activity levels, along with racing thoughts and decreased need for sleep (Jansen et al. 2011). Hypomania can be associated with increased creativity, productivity, and innovation, and is often seen in individuals with bipolar disorder (Furnham et al. 2008; Recommended Citation Recommended Citation n.d.). Some potential environmental factors that may contribute include chronic stress, substance abuse, and certain medical conditions or medications. Additionally, certain life events or situations may also trigger them, such as the loss of a loved one or a major life transition (Sarasso et al. 2022; Gaggioli and Others 2016; W. R. Miller and Baca 2001).

### **3.4. Hypnotic trance**

Trance is a state of altered consciousness in which a person is highly receptive to suggestion and is able to focus their attention on a specific idea or task to the exclusion of other stimuli (David Spiegel 2013). This altered state of consciousness is often characterized by a lack of executive control and a heightened ability to respond to suggestions and can allow a person to enter a deep state of relaxation or experience altered perceptions of reality. This can lead to the expression of emotions that are normally suppressed, as well as the ability to perform actions or engage in behaviors that are normally resisted (Brenman, Gill, and Hacker 1947). In this way, hypnosis can be seen as a loss of modularity between action, communication, and emotion, where patients will express things they would otherwise keep for themselves. The fusion is thought to occur because the hypnotic state allows a person to bypass their normal inhibitions and barriers to communication (Lynn and O'Hagen 2009). Hypnosis is often used in therapy to help people overcome psychological barriers and induce behavioral change (Williamson 2019). It has been shown effective in treating a variety of conditions, including anxiety (Kılıç, Karadağ, and Tutar 2023), phobias (Wolf et al. 2022), chronic pain (Geagea et al. 2022) and post-traumatic stress disorder (D. Spiegel and Cardena 1990). In terms of the factors influencing the success of hypnosis, the willingness of the person being hypnotized, a relaxed physical and mental state, level of suggestibility and ability to focus

attention, a well-designed hypnotic induction script or a calming and relaxing setting, such as a comfortable chair or a quiet room, and techniques such as eye fixation or visualization to help the person focus their attention are all crucial elements (Geagea et al. 2022; Robertson 2018). In addition to inducing a state of relaxation, hypnosis can also be used to help individuals explore hierarchical layers of cognition ordinarily beyond conscious access, to uncover the root causes of certain behaviors or emotional states (Putnam 1992). This raises the essential question of the relationship between primary states and insight, where primary states are sometimes associated with profound realizations and epiphanies. The same pattern also concerns the fields of psychedelic (etymologically “mind-revealing”), psychosis (Amador and Kronengold 1998) and dreams. In many cultures, these states and inducing events are revered for their potential to bring forth novel perceptions that can be perceived to benefit both the individual and society.

### **3.5. Dreams**

A more advanced stage in the loss of arousal function than hypnotic states, dreams are typically characterized by a lack of awareness of the external world, as well as by a distorted sense of time and space (A. Hobson and Voss 2011; Kuiken 2010; Auld, Goldenberg, and Weiss 1968; Domino 1976; Fisher 1954). In some cases, dreams can be vivid and realistic, while in others they may be abstract or surreal. Much has been written and said about dreams so we will not delve too deeply in the topic here, for a more extensive analysis of dreams as primary states refer to (A. Hobson and Voss 2011). Dreams have long been of interest to psychologists and researchers, as they are thought to provide insight into an individual's subconscious thoughts and emotions. Some researchers have even suggested that dreams may serve as a means of processing and integrating experiences and emotions from the waking world (Auld, Goldenberg, and Weiss 1968; Fisher 1954). In dreams, one indeed has limited control over their thoughts and actions as they do in the waking world, which is highlighted by the fact that some individuals try to train themselves in lucid dreaming, which allegedly allows them to exert some degree of control over certain aspects of their dream state (Stumbrys et al. 2012).

Dreams can lead to the experience of scenarios and events that may not be logical or rational but are still highly meaningful and significant to the individual (cf. Bleuler's alogic symptomatology in schizophrenia (D. D. Miller, Arndt, and Andreasen 1993)). In dreams as in hypnosis, action, communication, and emotion are fused into one as they are no longer inhibited by the normal constraints of the waking world, and may therefore be more freely and spontaneously expressed, leading to phenomena such as sleep-talking and somnambulism. Dreams occur mostly during the REM (rapid eye movement) stage of sleep where the brain becomes highly active and produces a type of brain wave known as theta waves (Karashima et al. 2001), also associated to meditation (Lagopoulos et al. 2009), psychedelic intake (Timmermann et al. 2019), and schizophrenia (Ishii et al. 2000). Additionally, the release of chemicals such as serotonin and norepinephrine during REM sleep are thought to play a role in the production of dreams (Stern et al. 1971). Several external factors that can influence and induce dreams including, certain medications or substances, such as alcohol or drugs, which alter brain activity and the dreaming process (Wolin and Mello 1973). Sleep deprivation can also influence dreams (Berger and Oswald 1962). Emotional states such as stress, anxiety, or excitement can also influence the quality and content of dreams (Levin and Nielsen 2007), as well as environmental factors such as noise, temperature, and light (Soui 1991).

### **3.6. Religious experiences**

Primary state of consciousness in religious devotees may manifest in a number of ways. Like dreams, this topic has received considerable attention from anthropologists, psychologists, and psychiatrists and we will only mention the most important aspects as they relate to other types of primary states in humans. For example, a person may become deeply absorbed in prayer or meditation (Lifshitz, van Elk, and Luhrmann 2019), where they focus all of their attention on their religious practices and are less aware of their surroundings (Harmon and Myers 1999). This can lead to a trance-like state, where a person then becomes highly receptive to and exaggerate external stimuli (Fulford and Jackson 1997). Indeed, religious experiences are personal and individual, and therefore cannot be induced in the same way that one might induce a physical or psychological

response through hypnosis, sleep, or psychedelic intake. They have been discussed in the literature as self-transcendent experiences (Wesselman and Don Norman 1997), awe (Van Cappellen and Saroglou 2012), and admiration or elevation (Algoe and Haidt 2009). Indeed, mystical experiences has been the subject of extensive research in recent years (Beauregard and Paquette 2006; Stein 2018; Søndergaard et al. 2022). Interestingly, the phenomenon of thought-action fusion discussed previously correlates with religiosity (Eric Rassin et al. 1999; E. Rassin and Koster 2003).

In some cases, intense levels of religious devotion can lead to cults, where a group of individuals share a strong belief in a particular religious ideology and are willing to follow it to the exclusion of all else (Storr 1996). Cult leaders often exploit their followers' vulnerabilities by encouraging them to participate in behaviors that defy social conventions and undermine their psychological defenses. These practices (e.g., the cults of Jim Jones, David Koresh, Gurdjieff and others) can include intense or ritualistic sexual practices, physical challenges or initiations, or acts of aggression or violence (i.e., a form of social, unconstrained cognition). For example, cult followers of Sheela Rajneesh constantly perpetrated sexual abuse on each other, promoted sterilization, and carried out a terrorist attack by poisoning 750 people in the local community (McCormack 2010), which did not stop them from considering the experience of being part of the abusive community as “the best and most meaningful thing that happened to them” (Storr 1996). The goal of these practices is often to create a sense of loyalty and commitment to the cult, as well as to weaken the individual's resistance to the cult's ideology and control. Cult leaders may also use these practices to manipulate and exploit their followers, taking advantage of their vulnerability and willingness to do whatever is asked of them.

### **3.7. Catastrophes such as famine or war**

In response to a highly traumatic or stressful situation, a person's normal inhibitions or restraints on their aggressive behavior can be relaxed or lifted. In the context of events such as war or famine, the disinhibition of aggression may lead to a primary state of consciousness, where a person becomes focused on the present moment and foregoes the long-term consequences of their actions (Sorokin and

Horowitz 2017; Fox 1974). The failure to integrate the event within the broader range of past experiences may lead to psychosis, where one experiences a break from reality (Cameron and Mamon 2019). "When threatened with war, epidemics, famine, and other disasters, many people regress to paranoid-schizoid stage of development splitting between extreme forms of moral judgment (good vs. bad), in which they will follow guru-like leaders whom they invest with magical powers for good while at the same time defining scapegoats whom they blame for the disaster and regard as wholly evil." (Storr 1996). See more examples in (Cohn 1962).

### **3.8. Childhood and senility**

Though they cannot be considered as states per se, both life stages of childhood and senility are associated with distinct changes in the way that the brain functions and processes information that characterizes primary states of consciousness. During childhood, the brain undergoes rapid development and maturation, with significant structural and functional changes (Tierney and Nelson 2009). This process continues throughout adolescence and leads to the genesis of secondary states of consciousness and their associated cognitive abilities, such as language, attention, and reasoning. In contrast, during senility, the brain undergoes a decline and deterioration, leading to disturbances and inappropriate behaviors. This is a natural part of the aging process and is associated with changes in the structure and function of the brain that can affect cognitive abilities and overall brain function (Riddle 2007). For example, senility is often associated with a decline in memory and other cognitive abilities (Brickman and Stern 2009), as well as changes in mood and behavior (Phillips, Smith, and Gilhooly 2002).

## **4. Mild forms of primary states and their inducers**

In comparison to the strong primary states of consciousness, it is possible to distinguish in humans some primary states with lower levels of intensity or duration. For example, daydreaming may be considered a relatively weak form of primary state of consciousness, as it typically involves a mild decrease in alertness and may be relatively

short in duration. Meditation involves a more sustained focus of the mind and may result in a deeper level of immersion or absorption. Similarly, transient psychotic episodes may be considered a weak form of primary state of consciousness due to the limited duration of the hallucinations and delusions experienced.

**Daydreaming** is a mild form of primary states of consciousness and the first stage of loss of arousal function, where a person's level of alertness decreases and they become gradually less aware of their surroundings (Singer 1975). As a result, they may begin to lose control over their thoughts and their inner world. This can lead to a hypnogogic state, which is a dream-like state that occurs when a person is falling asleep, or a hypnopompic state, that occurs when a person is waking up. In both cases, the person may experience vivid hallucinations (Ohayon et al. 1996) and an increase in creativity, allegedly leveraged by inventors such as Edison, Tesla and Da Vinci (Stembridge 1972).

**Regression** refers to the reinstatement in childhood states (e.g., in couple intimacy or during interaction with animals or babies) or the act of returning to a previous or less mature state, often in response to stress or other challenging situations (Barthol and Ku 1959). In some cases, this may involve a reinstatement of childhood states, where an adult may behave in ways that are similar to how they behaved as a child. This can happen in couples, where one or both partners may exhibit behaviors that are characteristic of their childhood (Lokko and Stern 2015), or in situations where an adult interacts with animals or babies, who may elicit a more childlike response from the adult (Steinnes et al. 2019). Under hypnosis, regression may lead to the resurgence of children traits that disappear at the adult age such as the Babinsky reflex (Barber 1962).

**Absorption** refers to becoming completely absorbed in an activity or experience, to the point where the person's awareness of their surroundings and external stimuli is reduced (Roche and McConkey 1990; Vaitl et al., n.d.; Jamieson 2005). Engaging in activities such as reading a book, watching a film, listening to music, or having a conversation can all lead to a state of deep immersion or flow (Csikszentmihalyi, Abuhamdeh, and Nakamura

2005), where the person becomes deeply focused on the activity at hand. In some cases, immersion leads to difficulty distinguishing between what is real and what is not (Baars 1997).

**Meditation** is a practice that involves focusing the mind on a particular object, thought, or activity in order to achieve a state of relaxation or inner peace (Kokoszka 2007; Lu and Rodriguez-Larios 2022). This practice of meditation as a primary state of consciousness may involve a reduced awareness of external stimuli and an increased focus on the internal experiences and sensations of the meditator (Barmark and Gaunitz 1979). This can lead to a trance-like state, where the person becomes deeply absorbed in their meditation and is less aware of their surroundings.

**Transient psychotic episodes** are a mild form of primary state of consciousness that are characterized by a temporary alternation of subjective experience with the production of hallucinations, depersonalization, or derealization, as well as delusional constructions (Schwartz 1961). These experiences can be complex and may include symptoms that have the appearance of being psychotic, but do not necessarily result in a lasting modification of the personality. Studies on the premorbid manifestations of schizophrenia have reopened the debate on "minor forms of psychosis" and their potential detection and early treatment (Di Rocco 2016). These studies have shown that it is possible to experience hallucinations, delusions, or other psychotic-like phenomena without developing a full-blown psychosis, particularly during adolescence or childhood.

## **5. Neurobiologic considerations**

Neurobiological plausibility is a crucial aspect of developing scientific models of mind and behavior, as it ensures that the model accurately reflects the reality of biological processes underlying neural activity. ACE fusion should involve a breakdown of the neural regulatory mechanisms that control emotional processing, behavior, and communication. Changes in brain activity—including increase in corticostriatal

connectivity and decrease in brain modularity—are characteristic of psychosis, dreams, and psychedelic experiences. These are thought to underlie the profound alterations in perception and consciousness that are often reported during these experiences. By studying the neural mechanisms underlying ACE fusion, we can hope to gain a deeper understanding of how the brain regulates emotions, behaviors, and communication in both healthy and pathological states, and insights for the control of primary states in laboratory or clinical settings.

Perhaps a relevant parallel to the notion of ACE fusion in neurobiology is cellular differentiation, used in the context of aging (Koen and Rugg 2019; Carp et al. 2011; Koen, Srokova, and Rugg 2020), neurodegeneration (Caldwell et al. 2020), and strokes (Fu, Zhao, and Hu 2018), to account for the significant behavioral changes associated with these conditions. In the context of cell biology, differentiation refers to the process by which cells become more specialized and acquire specific functions. Under special circumstances, (e.g., tissue repair), cells can undergo cellular dedifferentiation, where they acquire the potential to differentiate into a variety of cell types again (Cai, Fu, and Sheng 2007), a feature known as pluripotency (e.g., stem cells in the bone marrow can differentiate into various types of blood cells, but not into nerve cells). In primary states, the temporary disruption of the usual regulatory mechanisms responsible for emotional processing, behavioral execution, and communication could be seen as a neural dedifferentiation of the associated modules. This disruption could explain the increased flexibility, heightened emotional reactivity, changes in behavior, and altered patterns of communication characteristic of the various states described in the previous sections. Neural dedifferentiation in the context of ACE fusion may thereby allow for novel and creative behaviors to emerge, as the usual constraints and inhibitions on behavior are temporarily lifted. Similar to how during tissue repair, dedifferentiation of cells enables a more adaptive response to the damage and the creation of new tissue structures that may not have existed before. By temporarily suspending the usual constraints on behavior, ACE fusion leads to new, unprecedented ways of thinking, feeling, and behaving. Perhaps the creative illness characteristic of artistic and creative endeavors is a

paramount example of how the relaxation of inhibitions can lead to unique, novel cognitive and behavioral patterns.

We saw in the second section that primary, archaic states of consciousness have been related to 1) dynamic interactions between cortical and subcortical brain regions and 2) global brain hyperconnectivity. The subcortical regions, including the amygdala, thalamus, and brainstem, are involved in processing and integrating sensory information, emotional response, and regulating arousal. The cortical regions, including the prefrontal cortex, parietal cortex, and posterior cingulate cortex, are involved in attentional processes, executive control, and higher-order cognitive functions (i.e., secondary states of consciousness). There is an extensive literature on the neural correlate of emotional regulation and cognitive flexibility that one can draw from. The temporary neural dedifferentiation during episodes of primary states may involve disruptions in the corticostriatal connection, thought to be involved in regulating and modulating emotional and behavioral responses. Alternatively, the temporary convergence of neural processing streams may be related to global hyperconnectivity and loss of modularity in the brain, which has been proposed to underlie altered states of consciousness. Both lines of work are related insofar as the breakdown of the normal inhibitory control mechanisms that keep different brain regions and circuits operating distinctly from each other, should naturally allow for greater cross-communication and integration at a global level. There is indeed a chemical basis to the integration, where the balance of specific neurotransmitter systems, such as serotonin and dopamine can influence the degree of neural differentiation and integration. Recent neuroimaging studies show that psychedelic compounds like LSD and psilocybin can induce changes in the connectivity and dynamics of large-scale brain networks, including the default mode network (DMN), which is involved in self-referential processing and introspection, and the salience network, which is involved in detecting and integrating salient sensory and emotional information (Stoliker et al. 2022; Viol et al. 2017; Girn et al. 2022; Daws et al. 2021). The REBUS model, proposed by Carhartt Harris and colleagues, suggests that the DMN breakdown leads to a state of “unconstrained” cognition. The DMN is a network of brain regions that is active during rest and self-referential processing, and is thought to be

involved in the maintenance of the sense of self. During psychedelic intake in major depression disorder, alterations in the DMN and increased connectivity between subcortical and cortical regions lead to a loss of global brain modularity.

In REBUS, the brain is broadly defined as a hierarchical system of prediction attempting to minimize the prediction errors between incoming perceptual changes and their internal anticipatory models. In the words of Carhartt Harris (2010), “we pursue the idea that these intrinsic networks correspond to the high-levels of an inferential hierarchy, which function to suppress the free energy of lower levels (i.e. suppress prediction errors with top-down predictions). We associate this optimization process with the secondary process. Furthermore, we associate failures of top-down control with non-ordinary states of consciousness, such as early and acute psychosis, the temporal-lobe aura, dreaming, and hallucinogenic drug states.” Some of these regions include the medial prefrontal cortex, the posterior cingulate cortex, the inferior parietal lobule, the lateral and inferior temporal cortex, and the medial temporal lobes. Crucially, the phenomenology of primary states seems to be an important predictor for long-term recovery in psychedelic-assisted psychotherapy (Ko et al. 2022).

The model has been critiqued for its oversimplification of the complex effects that psychedelics have on the brain and consciousness. As an alternative, Adam Safron’s ALBUS model suggests that different levels of stress may result in varying subjective, phenomenologic characteristics of the experience (Adam Safron 2020; Ciaunica and Safron 2022). Neurophenomenological models of primary states of consciousness can therefore be informed by these framework and their emphasis on the interplay between serotonergic (5-HT<sub>2A</sub>R) stimulation and the dynamics of large-scale neural activity (Adam Safron 2016, 2020). By understanding the complex interactions between the neural mechanisms underlying primary states of consciousness, we can gain a deeper insight into the transformative potential of psychedelics and their potential applications in mental health and well-being.

## 6. Conclusion

Following a view of consciousness as a mechanism of control and differentiation essential to the emergence of advanced forms of cultural organization, we suggested that some remnants of phylogenetically older forms of consciousness remain in humans, inherently related to the biological imperatives of the species. These primary states of consciousness may take over in psychosis as a catastrophic breakdown of healthy defense mechanisms allowing the individual to conciliate the contradictions stemming from the vastly different time scales of biological evolution and cultural evolution. As we have tried to demonstrate here, primary states are perhaps best characterized as a fusion of the otherwise relatively independent modules controlling action, emotion, and communication. As such they fail the trial of social reality (i.e., reality testing) and are usually prohibited or controlled. We examined and compared their various occurrences in different contexts in an attempt to capture some similarities for the purpose of their control in laboratory settings. We have also discussed the agents that can induce primary states. In light of recent interest dissociative anaesthetics such as ketamine, it would be interesting to explore the neural and cognitive bases of dissociative states, and how they differ from the primary states discussed here (e.g., hypnosis, regression, daydreaming, and trance-like religious experiences). Further research in this area could shed light on the underlying mechanisms and how they relate to consciousness and the brain.

In order to facilitate further research and unfold its potential therapeutic benefits, we need a safe and reliable way to elicit primary states in the laboratory to study their causes and consequences. While inducing primary states of consciousness in a laboratory or clinical setting may have potential benefits for psychiatric and psychological research, it is important to consider the potential risks and limitations of such practices. One potential risk of inducing primary states in a laboratory or clinical setting is the potential for adverse reactions or unintended consequences. For example, certain techniques or agents used to induce primary states, such as sensory deprivation or hallucinogenic drugs, may cause unwanted side effects or adverse reactions in some individuals. The induction of primary states may also trigger existing mental health

conditions or exacerbate existing symptoms. Therefore, it is important to carefully evaluate the potential risks and benefits of inducing primary states in any given individual, and to take appropriate precautions to minimize the risks.

Another potential limitation of inducing primary states in a laboratory or clinical setting is the potential for subjective experiences and interpretations. Primary states of consciousness are individual, personal events and can be difficult to measure or assess objectively leading to replicability issues. Additionally, individuals may have different interpretations or experiences of primary states, which can make it challenging to draw definitive conclusions. As such, it is important to consider the potential for subjective experiences and interpretations when conducting research on primary states, and to take appropriate steps to mitigate these limitations.

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## 7. References

- Abell, Arthur M. 2016. *Talks With Great Composers*. Pickle Partners Publishing.
- Adams, Rick A., Klaas Enno Stephan, Harriet R. Brown, Christopher D. Frith, and Karl J. Friston. 2013. "The Computational Anatomy of Psychosis." *Frontiers in Psychiatry / Frontiers Research Foundation* 4 (May): 47.
- Algoe, Sara B., and Jonathan Haidt. 2009. "Witnessing Excellence in Action: The 'Other-Praising' Emotions of Elevation, Gratitude, and Admiration." *The Journal of Positive Psychology* 4 (2): 105–27.
- Amador, Xavier F., and Henry Kronengold. 1998. "The Description and Meaning of Insight in Psychosis." *Insight and Psychosis*, 15–32.
- Arieti, Silvano. 1955. "Interpretation of Schizophrenia" 522. <https://psycnet.apa.org/fulltext/1955-07632-000.pdf>.
- Aru, Jaan, Talis Bachmann, Mototaka Suzuki, and Matthew E. Larkum. 2023. "Primer on the Dendritic Integration Theory of Consciousness." <https://psyarxiv.com/vkdt2/download?format=pdf>.
- Auld, F., G. M. Goldenberg, and J. V. Weiss. 1968. "Measurement of Primary-Process Thinking in Dream Reports." *Journal of Personality and Social Psychology* 8 (4): 418–26.
- Baars, Bernard J. 1997. "The Spotlight: Attention, Absorption, and The Construction of Reality." *In the Theater of Consciousness*. <https://doi.org/10.1093/acprof:oso/9780195102659.003.0005>.
- Bachmann, Talis, Mototaka Suzuki, and Jaan Aru. 2020. "Dendritic Integration Theory: A Thalamo-Cortical Theory of State and Content of Consciousness." *Philosophy and the Mind Sciences* 1 (II). <https://philosophymindscience.org/index.php/phimisci/article/view/8946>.

- . n.d. "Dendritic Integration Theory."  
<https://pdfs.semanticscholar.org/db91/83e797732426cb70dedab0bd295c2c2dc94c.pdf>.
- Barber, T. X. 1962. "Hypnotic Age Regression: A Critical Review." *Psychosomatic Medicine* 24: 286–99.
- Barcai, A. 1972. "Acute Episodic Psychophysiological Decompensation (A.E.P.P.D.)." *Psychosomatics* 13 (5): 289–92.
- . 1974. "Acute Episodic Psychophysiological Decompensation (AEPPD). I. The Individual's Psychosomatic Position." *The British Journal of Medical Psychology* 47 (2): 163–72.
- Bar-Haim, Shaul. 2014. "Regression and the Maternal in the History of Psychoanalysis, 1900–1957." *Psychoanalysis and History* 16 (1): 69–94.
- Barmark, Susanne M., and Samuel C. B. Gaunitz. 1979. "Transcendental Meditation and Heterohypnosis as Altered States of Consciousness." *The International Journal of Clinical and Experimental Hypnosis* 27 (3): 227–39.
- Barrett, Frederick S., Manoj K. Doss, Nathan D. Sepeda, James J. Pekar, and Roland R. Griffiths. 2020. "Emotions and Brain Function Are Altered up to One Month after a Single High Dose of Psilocybin." *Scientific Reports* 10 (1): 2214.
- Barthol, R. P., and N. D. Ku. 1959. "Regression under Stress to First Learned Behavior." *Journal of Abnormal Psychology* 59 (1): 134–36.
- Bayne, Tim, Anil K. Seth, and Marcello Massimini. 2020. "Are There Islands of Awareness?" *Trends in Neurosciences* 43 (1): 6–16.
- Beauregard, Mario, and Vincent Paquette. 2006. "Neural Correlates of a Mystical Experience in Carmelite Nuns." *Neuroscience Letters* 405 (3): 186–90.
- Bentall, R. P., G. A. Baker, and S. Havers. 1991. "Reality Monitoring and Psychotic Hallucinations." *The British Journal of Clinical Psychology / the British Psychological Society* 30 (3): 213–22.
- Berger, R. J., and I. Oswald. 1962. "Effects of Sleep Deprivation on Behaviour, Subsequent Sleep, and Dreaming." *The Journal of Mental Science* 108 (July): 457–65.
- Birch, Jonathan. 2022. "The Search for Invertebrate Consciousness." *Nous* 56 (1): 133–53.
- Bleuler, Eugen, and Abraham Arden Brill. 1924. *Textbook of Psychiatry*. Macmillan.
- Block, Ned. 1992. "Begging the Question against Phenomenal Consciousness." *The Behavioral and Brain Sciences* 15 (2): 205–6.
- Boks, Marco P. M., Stuart Leask, Jeroen K. Vermunt, and René S. Kahn. 2007. "The Structure of Psychosis Revisited: The Role of Mood Symptoms." *Schizophrenia Research* 93 (1-3): 178–85.
- Brenman, M., M. M. Gill, and F. J. Hacker. 1947. "Alterations in the State of the Ego in Hypnosis." *Bulletin of the Menninger Clinic* 11 (2): 60–66.
- Brickman, A. M., and Yaakov Stern. 2009. "Aging and Memory in Humans."  
<https://academiccommons.columbia.edu/doi/10.7916/s690-zt94/download>.
- Broome, Matthew R., James B. Woolley, Paul Tabraham, Louise C. Johns, Elvira Bramon, Graham K. Murray, Carmine Pariante, Philip K. McGuire, and Robin M. Murray. 2005. "What Causes the Onset of Psychosis?" *Schizophrenia Research* 79 (1): 23–34.
- Brosin, Henry W. 2007. "The Primary Processes and Psychoses." *Systems Research: The Official Journal of the International Federation for Systems Research* 2 (1): 62–67.
- Buckley, Peter. 1988. *Essential Papers on Psychosis*. NYU Press.
- Cai, Sa, Xiaobing Fu, and Zhiyong Sheng. 2007. "Dedifferentiation: A New Approach in Stem Cell Research." *Bioscience* 57 (8): 655–62.
- Caldwell, Andrew B., Qing Liu, Gary P. Schroth, Douglas R. Galasko, Shauna H. Yuan, Steven L. Wagner, and Shankar Subramaniam. 2020. "Dedifferentiation and Neuronal Repression Define Familial Alzheimer's Disease." *Science Advances* 6 (46). <https://doi.org/10.1126/sciadv.aba5933>.
- Cameron, Amy Y., and Daria Mamon. 2019. "Towards A Better Understanding of Hypervigilance in Combat Veterans." *Military Behavioral Health* 7 (2): 206–17.
- Caprara, G. V., R. R. Holt, M. F. Pazielli, and A. Giannotti. 1986. "The Development of Primary Process in Children's Rorschachs." *Journal of Personality Assessment* 50 (2): 149–70.
- Carhart-Harris, R. L., and K. J. Friston. 2019. "REBUS and the Anarchic Brain: Toward a Unified Model of the Brain Action of Psychedelics." *Pharmacological Reviews* 71 (3): 316–44.
- Carp, Joshua, Joonkoo Park, Andrew Hebrank, Denise C. Park, and Thad A. Polk. 2011. "Age-Related Neural Dedifferentiation in the Motor System." *PLoS One* 6 (12): e29411.

- Chen, Wen G., Dana Schloesser, Angela M. Arensdorf, Janine M. Simmons, Changhai Cui, Rita Valentino, James W. Gnad, et al. 2021. "The Emerging Science of Interoception: Sensing, Integrating, Interpreting, and Regulating Signals within the Self." *Trends in Neurosciences* 44 (1): 3–16.
- Chieze, Marie, Samia Hurst, Stefan Kaiser, and Othman Sentissi. 2019. "Effects of Seclusion and Restraint in Adult Psychiatry: A Systematic Review." *Frontiers in Psychiatry / Frontiers Research Foundation* 10 (July): 491.
- Ciaunica, Anna, and Adam Safron. 2022. "Disintegrating and Reintegrating the Self--(In) Flexible Self-Models in Depersonalisation and Psychedelic Experiences." <https://psyarxiv.com/mah78/download?format=pdf>.
- Clinchy, Michael, Michael J. Sheriff, and Liana Y. Zanette. 2013. "Predator-Induced Stress and the Ecology of Fear." *Functional Ecology* 27 (1): 56–65.
- Cohn, Norman. 1962. *The Pursuit of the Millenium: Revolutionary Messianism in the Middle Ages and Its Bearing on Modern Totalitarian Movements*. Mercury.
- Cramer, Phebe. 2006. *Protecting the Self: Defense Mechanisms in Action*. Guilford Press.
- Csikszentmihalyi, Mihaly, Sami Abuhamdeh, and Jeanne Nakamura. 2005. "Flow." *Handbook of Competence and Motivation*, 598–608.
- Damasio, A. R. 1996. "The Somatic Marker Hypothesis and the Possible Functions of the Prefrontal Cortex." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 351 (1346): 1413–20.
- Davis, Alan K., Frederick S. Barrett, Sara So, Natalie Gukasyan, Thomas C. Swift, and Roland R. Griffiths. 2021. "Development of the Psychological Insight Questionnaire among a Sample of People Who Have Consumed Psilocybin or LSD." *Journal of Psychopharmacology* 35 (4): 437–46.
- Daws, Richard, Christopher Timmerman, Bruna Giribaldi, James Sexton, Matthew Wall, David Erritzoe, Leor Roseman, David Nutt, and Robin Carhart-Harris. 2021. "Decreased Brain Modularity after Psilocybin Therapy for Depression." <https://www.researchsquare.com/article/rs-513323/latest.pdf>.
- Delfosse, Céline, Frédéric Nils, Sophie Lasserre, and Bernard Rimé. 2004. "Les motifs allégués du partage social et de la rumination mentale des émotions : comparaison des épisodes positifs et négatifs." *Les cahiers internationaux de psychologie sociale* Numéro 64 (4): 35–44.
- Dell'osso, Liliana, Giulia Casu, Marina Carlini, Ciro Conversano, Paola Gremigni, and Claudia Carmassi. 2012. "Sexual Obsessions and Suicidal Behaviors in Patients with Mood Disorders, Panic Disorder and Schizophrenia." *Annals of General Psychiatry* 11 (1): 27.
- Denton, D. A., M. J. McKinley, M. Farrell, and G. F. Egan. 2009. "The Role of Primordial Emotions in the Evolutionary Origin of Consciousness." *Consciousness and Cognition* 18 (2): 500–514.
- Denton, Derek. 2006. "The Primordial Emotions: The Dawning of Consciousness," June. <https://doi.org/10.1093/acprof:oso/9780199203147.001.0001>.
- Di Rocco, Vincent. 2016. "Psychosis as a Defense Against Psychotic States of the Psyche." *Research in Psychoanalysis* 22 (2): 180–89.
- Domino, G. 1976. "Primary Process Thinking in Dream Reports as Related to Creative Achievement." *Journal of Consulting and Clinical Psychology* 44 (6): 929–32.
- Edelman, Gerald M. 2003. "Naturalizing Consciousness: A Theoretical Framework." *Proceedings of the National Academy of Sciences of the United States of America* 100 (9): 5520–24.
- Elgar, M. A. 1989. "Predator Vigilance and Group Size in Mammals and Birds: A Critical Review of the Empirical Evidence." *Biological Reviews of the Cambridge Philosophical Society* 64 (1): 13–33.
- Ellenberger, Henri F. 1970. *Discovery Of The Unconscious*. Basic Books.
- Ellenberger, H. F. 1968. "The Concept of Creative Illness." *Psychoanalytic Review* 55 (3): 442–56.
- Fisher, C. 1954. "Dreams and Perception; the Role of Preconscious and Primary Modes of Perception in Dream Formation." *Journal of the American Psychoanalytic Association* 2 (3): 389–445.
- Fox, R. P. 1974. "Narcissistic Rage and the Problem of Combat Aggression." *Archives of General Psychiatry* 31 (6): 807–11.
- Freud, Sigmund. 1983. "2. The Interpretation of Dreams." In *Literature and Psychoanalysis*, edited by Edith Kurzweil and William Phillips, 29–33. New York Chichester, West Sussex: Columbia University Press.
- Friston, Karl, Spyridon Samothrakis, and Read Montague. 2012. "Active Inference and Agency: Optimal Control without Cost Functions." *Biological Cybernetics* 106 (8-9): 523–41.
- Fromm, Erich. 1973. *The Anatomy of Human Destructiveness*. New York: Holt, Rinehart and Winston.

- Fromm, Erika. 1976. "Altered States of Consciousness and Ego Psychology." *The Social Service Review* 50 (4): 557–69.
- Fulford, K. W. M., and Mike Jackson. 1997. "Spiritual Experience and Psychopathology." *Philosophy, Psychiatry, & Psychology: PPP* 4 (1): 41–65.
- Furnham, Adrian, Mark Batey, Katen Anand, and James Manfield. 2008. "Personality, Hypomania, Intelligence and Creativity." *Personality and Individual Differences* 44 (5): 1060–69.
- Fu, Xiaobing, Andong Zhao, and Tian Hu. 2018. "Central Nervous System and Dedifferentiation." In *Cellular Dedifferentiation and Regenerative Medicine*, edited by Xiaobing Fu, Andong Zhao, and Tian Hu, 1–17. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Gaggioli, Andrea, and Others. 2016. "Transformative Experience Design." *Human Computer Confluence. Transforming Human Experience through Symbiotic Technologies*, 96–121.
- Gay, Volney P., E. G. d'Aquili, C. D. Laughlin, and John McManus. 1980. "The Spectrum of Ritual: A Biogenetic Structural Analysis." *Journal for the Scientific Study of Religion* 19 (2): 224.
- Geagea, Dali, Zephania Tyack, Roy Kimble, Vince Polito, Bassel Ayoub, Devin B. Terhune, and Bronwyn Griffin. 2022. "Clinical Hypnosis for Procedural Pain and Distress in Children: A Scoping Review." *Pain Medicine*, November. <https://doi.org/10.1093/pm/pnac186>.
- Girn, Manesh, Leor Roseman, Boris Bernhardt, Jonathan Smallwood, Robin Carhart-Harris, and R. Nathan Spreng. 2022. "Serotonergic Psychedelic Drugs LSD and Psilocybin Reduce the Hierarchical Differentiation of Unimodal and Transmodal Cortex." *NeuroImage* 256 (August): 119220.
- Goekoop, Rutger, and Roy de Kleijn. 2021. "How Higher Goals Are Constructed and Collapse under Stress: A Hierarchical Bayesian Control Systems Perspective." *Neuroscience and Biobehavioral Reviews* 123 (April): 257–85.
- Harmer, Catherine J., Nicholas C. Shelley, Philip J. Cowen, and Guy M. Goodwin. 2004. "Increased Positive versus Negative Affective Perception and Memory in Healthy Volunteers Following Selective Serotonin and Norepinephrine Reuptake Inhibition." *The American Journal of Psychiatry* 161 (7): 1256–63.
- Harmon, R. L., and M. A. Myers. 1999. "Prayer and Meditation as Medical Therapies." *Physical Medicine and Rehabilitation Clinics of North America* 10 (3): 651–62.
- Harrison, Ben J., Carles Soriano-Mas, Jesus Pujol, Hector Ortiz, Marina López-Solà, Rosa Hernández-Ribas, Joan Deus, et al. 2009. "Altered Corticostriatal Functional Connectivity in Obsessive-Compulsive Disorder." *Archives of General Psychiatry* 66 (11): 1189–1200.
- Hayward, M. L. 1961. "Psychotherapy Based on the Primary Process." *American Journal of Psychotherapy* 15 (July): 419–30.
- Hentschel, Uwe, Gudmund J. W. Smith, Wolfram Ehlers, and Juris G. Draguns. 2012. *The Concept of Defense Mechanisms in Contemporary Psychology: Theoretical, Research, and Clinical Perspectives*. Springer Science & Business Media.
- Higginson, Sally, Warren Mansell, and Alex M. Wood. 2011. "An Integrative Mechanistic Account of Psychological Distress, Therapeutic Change and Recovery: The Perceptual Control Theory Approach." *Clinical Psychology Review* 31 (2): 249–59.
- Hobson, Allan, and Ursula Voss. 2011. "A Mind to Go out of: Reflections on Primary and Secondary Consciousness." *Consciousness and Cognition* 20 (4): 993–97.
- Hobson, Nicholas M., Juliana Schroeder, Jane L. Risen, Dimitris Xygalatas, and Michael Inzlicht. 2018. "The Psychology of Rituals: An Integrative Review and Process-Based Framework." *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc* 22 (3): 260–84.
- Holt, Robert R. 2002. "Quantitative Research on the Primary Process: Method and Findings." *Journal of the American Psychoanalytic Association* 50 (2): 457–82.
- . 2008. *Primary Process Thinking: Theory, Measurement, and Research*. Jason Aronson.
- Hosaka, Kazuhiko. 2015. "Intimidation Display." In *Mahale Chimpanzees: 50 Years of Research*, 435–47. Cambridge University Press.
- Hughlings Jackson, J. 1887. "Remarks on Evolution and Dissolution of the Nervous System." *The Journal of Mental Science* 33 (141): 25–48.
- Hurvich, Marvin. 1970. "On the Concept of Reality Testing." *The International Journal of Psychoanalysis* 51 (3): 299–312.

- Ishii, R., K. Shinosaki, Y. Ikejiri, S. Ukai, K. Yamashita, M. Iwase, Y. Mizuno-Matsumoto, et al. 2000. "Theta Rhythm Increases in Left Superior Temporal Cortex during Auditory Hallucinations in Schizophrenia: A Case Report." *Neuroreport* 11 (14): 3283–87.
- Jamieson, Graham A. 2005. "The Modified Tellegen Absorption Scale: A Clearer Window on the Structure and Meaning of Absorption." *Australian Journal of Clinical and Experimental Hypnosis* 33 (2): 119.
- Jansen, Karen, Liliane da Costa Ores, Taiane de Azevedo Cardoso, Rosangela da Costa Lima, Luciano Dias de Mattos Souza, Pedro Vieira da Silva Magalhães, Ricardo Tavares Pinheiro, and Ricardo Azevedo da Silva. 2011. "Prevalence of Episodes of Mania and Hypomania and Associated Comorbidities among Young Adults." *Journal of Affective Disorders* 130 (1-2): 328–33.
- Karashima, A., K. Nakamura, M. Watanabe, N. Sato, M. Nakao, N. Katayama, and M. Yamamoto. 2001. "Synchronization between Hippocampal Theta Waves and PGO Waves during REM Sleep." *Psychiatry and Clinical Neurosciences* 55 (3): 189–90.
- Keller, Heidi. 2002. "Development as the Interface between Biology and Culture: A Conceptualization of Early Ontogenetic Experiences." *Between Culture and Biology*. <https://doi.org/10.1017/cbo9780511489853.011>.
- Khalsa, Sahib S., Ralph Adolphs, Oliver G. Cameron, Hugo D. Critchley, Paul W. Davenport, Justin S. Feinstein, Jamie D. Feusner, et al. 2018. "Interoception and Mental Health: A Roadmap." *Biological Psychiatry. Cognitive Neuroscience and Neuroimaging* 3 (6): 501–13.
- Kılıç, Züleyha, Songül Karadağ, and Nuri Tutar. 2023. "The Effect of Progressive Relaxation Exercises on Dyspnea and Anxiety Levels in Individuals With COPD: A Randomized Controlled Trial." *Holistic Nursing Practice* 37 (1): E14–23.
- Koen, Joshua D., and Michael D. Rugg. 2019. "Neural Dedifferentiation in the Aging Brain." *Trends in Cognitive Sciences* 23 (7): 547–59.
- Koen, Joshua D., Sabina Srokova, and Michael D. Rugg. 2020. "Age-Related Neural Dedifferentiation and Cognition." *Current Opinion in Behavioral Sciences* 32 (April): 7–14.
- Kokoszka, Andrzej. 2007. *States of Consciousness: Models for Psychology and Psychotherapy*. Springer Science & Business Media.
- Ko, Kwonmok, Gemma Knight, James J. Rucker, and Anthony J. Cleare. 2022. "Psychedelics, Mystical Experience, and Therapeutic Efficacy: A Systematic Review." *Frontiers in Psychiatry / Frontiers Research Foundation* 13 (July): 917199.
- Kouidrat, Youssef, Ali Amad, Jean-Daniel Lalau, and Gwenole Loas. 2014. "Eating Disorders in Schizophrenia: Implications for Research and Management." *Schizophrenia Research and Treatment* 2014 (November): 791573.
- Kuiken, Don. 2010. "Primary and Secondary Consciousness during Dreaming." *International Journal of Dream Research*, April, 21–25.
- Lagopoulos, Jim, Jian Xu, Inge Rasmussen, Alexandra Vik, Gin S. Malhi, Carl F. Eliassen, Ingrid E. Arntsen, et al. 2009. "Increased Theta and Alpha EEG Activity during Nondirective Meditation." *Journal of Alternative and Complementary Medicine* 15 (11): 1187–92.
- LeDoux, Joseph E., and Richard Brown. 2017. "A Higher-Order Theory of Emotional Consciousness." *Proceedings of the National Academy of Sciences of the United States of America* 114 (10): E2016–25.
- Lee, Sang Won, Huijin Song, Tae Yang Jang, Hyunsil Cha, Eunji Kim, Yongmin Chang, and Seung Jae Lee. 2022. "Aberrant Functional Connectivity of Neural Circuits Associated with Thought-Action Fusion in Patients with Obsessive-compulsive Disorder." *Psychological Medicine* 52 (11): 2106–15.
- Letheby, C. 2015. "THE PHILOSOPHY OF PSYCHEDELIC TRANSFORMATION." *Journal of Consciousness Studies* 22 (9-10): 170–93.
- Letheby, Chris. 2021. *Philosophy of Psychedelics*. Oxford University Press.
- Letheby, Chris, and Philip Gerrans. 2017. "Self Unbound: Ego Dissolution in Psychedelic Experience." *Neuroscience of Consciousness*. <https://doi.org/10.1093/nc/nix016>.
- Levin, Ross, and Tore A. Nielsen. 2007. "Disturbed Dreaming, Posttraumatic Stress Disorder, and Affect Distress: A Review and Neurocognitive Model." *Psychological Bulletin* 133 (3): 482–528.
- Lifshitz, Michael, Michiel van Elk, and T. M. Luhrmann. 2019. "Absorption and Spiritual Experience: A Review of Evidence and Potential Mechanisms." *Consciousness and Cognition* 73 (August): 102760.
- Lokko, Hermioni N., and Theodore A. Stern. 2015. "Regression: Diagnosis, Evaluation, and Management."

- The Primary Care Companion to CNS Disorders* 17 (3). <https://doi.org/10.4088/PCC.14f01761>.
- Lorenz, Konrad. 1963. "On Aggression." <https://psycnet.apa.org/fulltext/1963-35034-000.pdf>.
- Lu, Yiqing, and Julio Rodriguez-Larios. 2022. "Nonlinear EEG Signatures of Mind Wandering during Breath Focus Meditation." *Current Research in Neurobiology* 3 (September): 100056.
- Lynn, Steven Jay, and Sean O'Hagen. 2009. "The Sociocognitive and Conditioning and Inhibition Theories of Hypnosis." *Contemporary Hypnosis*. <https://doi.org/10.1002/ch.378>.
- Malcolm, Benjamin, and Kelan Thomas. 2022. "Serotonin Toxicity of Serotonergic Psychedelics." *Psychopharmacology* 239 (6): 1881–91.
- Mansell, Warren. 2022. "An Integrative Control Theory Perspective on Consciousness." *Psychological Review*, July. <https://doi.org/10.1037/rev0000384>.
- Marcus, Eric. 2017. *Psychosis and Near Psychosis: Ego Function, Symbol Structure, Treatment*. Routledge.
- Maturana, H. R. 1990. "The Biological Foundations of Self Consciousness and the Physical Domain of Existence." *Beobachter: Konvergenz Der Erkenntnistheorien?* <https://cepa.info/paper.cgi?id=609&action=add>.
- Mayr, Ulrich. 2004. "Conflict, Consciousness, and Control." *Trends in Cognitive Sciences* 8 (4): 145–48.
- Mccormack, Win. 2010. *The Rajneesh Chronicles: The True Story of the Cult That Unleashed the First Act of Bioterrorism on U.S. Soil*. WW Norton.
- Micale, Mark S. 2014. *Beyond the Unconscious*. Princeton University Press.
- Miller, D. D., S. Arndt, and N. C. Andreasen. 1993. "Alogia, Attentional Impairment, and Inappropriate Affect: Their Status in the Dimensions of Schizophrenia." *Comprehensive Psychiatry* 34 (4): 221–26.
- Miller, William R., and Janet C'de Baca. 2001. *Quantum Change: When Epiphanies and Sudden Insights Transform Ordinary Lives*. Guilford Press.
- Mills, Jon. 2022. "Psyche as Inner Contradiction." *Psyche, Culture, World*. <https://doi.org/10.4324/9781003305958-2>.
- Minor, K. S., J. A. Willits, M. P. Marggraf, M. N. Jones, and P. H. Lysaker. 2019. "Measuring Disorganized Speech in Schizophrenia: Automated Analysis Explains Variance in Cognitive Deficits beyond Clinician-Rated Scales." *Psychological Medicine* 49 (3): 440–48.
- Muller, John J. 1963. *Regression in Schizophrenia as Manifested by Primary Process in Verbal Association*. Wayne State University, Department of Psychology.
- Northoff, Georg, and Victor Lamme. 2020. "Neural Signs and Mechanisms of Consciousness: Is There a Potential Convergence of Theories of Consciousness in Sight?" *Neuroscience and Biobehavioral Reviews* 118 (November): 568–87.
- Ohayon, M. M., R. G. Priest, M. Caulet, and C. Guilleminault. 1996. "Hypnagogic and Hypnopompic Hallucinations: Pathological Phenomena?" *The British Journal of Psychiatry: The Journal of Mental Science* 169 (4): 459–67.
- Osvath, Mathias, and Gema Martin-Ordas. 2014. "The Future of Future-Oriented Cognition in Non-Humans: Theory and the Empirical Case of the Great Apes." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 369 (1655). <https://doi.org/10.1098/rstb.2013.0486>.
- Panksepp, Jaak. 2005. "Affective Consciousness: Core Emotional Feelings in Animals and Humans." *Consciousness and Cognition* 14 (1): 30–80.
- Perlovsky, Leonid. 2016. "Human Consciousness Is Fundamental for Perception and Highest Emotions." *The Behavioral and Brain Sciences* 39 (January): e191.
- Perlovsky, Leonid I. 2007. "Neural Dynamic Logic of Consciousness: The Knowledge Instinct." In *Neurodynamics of Cognition and Consciousness*, edited by Leonid I. Perlovsky and Robert Kozma, 73–108. Berlin, Heidelberg: Springer Berlin Heidelberg.
- Perlovsky, Leonid, and Felix Schoeller. 2019. "Unconscious Emotions of Human Learning." *Physics of Life Reviews* 31 (December): 257–62.
- Phillips, Louise H., Liz Smith, and Ken J. Gilhooly. 2002. "The Effects of Adult Aging and Induced Positive and Negative Mood on Planning." *Emotion* 2 (3): 263–72.
- Powers, William T. 2009. "PCT and MOL: A Brief History of Perceptual Control Theory and the Method of Levels." *Cognitive Behaviour Therapy* 2 (3): 118–22.
- Preller, Katrin H., and Franz X. Vollenweider. 2018. "Phenomenology, Structure, and Dynamic of Psychedelic States." *Current Topics in Behavioral Neurosciences* 36: 221–56.
- Price, Cynthia J., and Carole Hooven. 2018. "Interoceptive Awareness Skills for Emotion Regulation:

- Theory and Approach of Mindful Awareness in Body-Oriented Therapy (MABT)." *Frontiers in Psychology* 9 (May): 798.
- Putnam, F. W. 1992. "Using Hypnosis for Therapeutic Abreactions." *Psychiatric Medicine* 10 (1): 51–65.
- Rassin, E., and E. Koster. 2003. "The Correlation between Thought–action Fusion and Religiosity in a Normal Sample." *Behaviour Research and Therapy* 41 (3): 361–68.
- Rassin, Eric, Harald Merckelbach, Peter Muris, and Victor Spaan. 1999. "Thought–action Fusion as a Causal Factor in the Development of Intrusions." *Behaviour Research and Therapy* 37 (3): 231–37.
- Ratcliffe, Matthew. 2008. *Feelings of Being: Phenomenology, Psychiatry and the Sense of Reality*. Oxford University Press.
- Recommended Citation Recommended Citation. n.d. "Let Us Know How Access to This Document Bbenefits You." Accessed May 1, 2023.  
<https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=5974&context=etd>.
- Riddle, David R. 2007. *Brain Aging: Models, Methods, and Mechanisms*. CRC Press.
- Rimé, Bernard, and Dario Páez. 2023. "Why We Gather: A New Look, Empirically Documented, at Émile Durkheim's Theory of Collective Assemblies and Collective Effervescence." *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, February, 17456916221146388.
- Riva, Giuseppe, Silvia Serino, Daniele Di Lernia, and Francesco Pagnini. 2021. "Regenerative Virtual Therapy: The Use of Multisensory Technologies and Mindful Attention for Updating the Altered Representations of the Bodily Self." *Frontiers in Systems Neuroscience* 15 (November): 749268.
- Robbins, Michael. 2018. "The Primary Process: Freud's Profound yet Neglected Contribution to the Psychology of Consciousness." *Psychoanalytic Inquiry* 38 (3): 186–97.
- Robertson, Donald J. 2018. *The Practice of Cognitive-Behavioural Hypnotherapy: A Manual for Evidence-Based Clinical Hypnosis*. Routledge.
- Roche, Suzanne M., and Kevin M. McConkey. 1990. "Absorption: Nature, Assessment, and Correlates." *Journal of Personality and Social Psychology* 59 (1): 91–101.
- Roseman, Leor, Eline Haijen, Kelvin Idialu-Ikato, Mendel Kaelen, Rosalind Watts, and Robin Carhart-Harris. 2019. "Emotional Breakthrough and Psychedelics: Validation of the Emotional Breakthrough Inventory." *Journal of Psychopharmacology* 33 (9): 1076–87.
- Rosen, John Nathaniel. 1947. "The Treatment of Schizophrenic Psychosis by Direct Analytic Therapy." *The Psychiatric Quarterly* 21 (1): 3–37.
- Safron, A. 2021. "World Models and the Physical Substrates of Consciousness: Hidden Sources of the Stream of Experience?" *Journal of Consciousness Studies*.  
[https://www.researchgate.net/profile/Adam-Safron/publication/356756353\\_World\\_Models\\_and\\_the\\_Physical\\_Substrates\\_of\\_Consciousness\\_Hidden\\_Sources\\_of\\_the\\_Stream\\_of\\_Experience/links/61b22b7b8a75650834c58c11/World-Models-and-the-Physical-Substrates-of-Consciousness-Hidden-Sources-of-the-Stream-of-Experience.pdf](https://www.researchgate.net/profile/Adam-Safron/publication/356756353_World_Models_and_the_Physical_Substrates_of_Consciousness_Hidden_Sources_of_the_Stream_of_Experience/links/61b22b7b8a75650834c58c11/World-Models-and-the-Physical-Substrates-of-Consciousness-Hidden-Sources-of-the-Stream-of-Experience.pdf).
- Safron, Adam. 2016. "What Is Orgasm? A Model of Sexual Trance and Climax via Rhythmic Entrainment." *Socioaffective Neuroscience & Psychology* 6 (October): 31763.
- . 2020. "On the Varieties of Conscious Experiences: Altered Beliefs Under Psychedelics (ALBUS)." <https://doi.org/10.31234/osf.io/zqh4b>.
- Samuels, Robert. 2019. "The Unconscious and the Primary Processes." In *Freud for the Twenty-First Century: The Science of Everyday Life*, edited by Robert Samuels, 27–42. Cham: Springer International Publishing.
- Sarasso, Pietro, Gianni Francesetti, Jan Roubal, Michela Gecele, Irene Ronga, Marco Neppi-Modona, and Katuscia Sacco. 2022. "Beauty and Uncertainty as Transformative Factors: A Free Energy Principle Account of Aesthetic Diagnosis and Intervention in Gestalt Psychotherapy." *Frontiers in Human Neuroscience; Lausanne*, July. <https://doi.org/10.3389/fnhum.2022.906188>.
- Scheepers, Floortje E., Jos de Mul, Frits Boer, and Witte J. Hoogendijk. 2018. "Psychosis as an Evolutionary Adaptive Mechanism to Changing Environments." *Frontiers in Psychiatry / Frontiers Research Foundation* 9 (June): 237.
- Schoeller, Félix, Leonid Perlovsky, and Dmitry Arseniev. 2018. "Physics of Mind: Experimental Confirmations of Theoretical Predictions." *Physics of Life Reviews* 25 (August): 45–68.
- Schoeller, F., A. J. H. Haar, A. Jain, and P. Maes. 2019. "Enhancing Human Emotions with Interoceptive

- Technologies." *Physics of Life Reviews* 31 (December): 310–19.
- Schwartz, D. A. 1961. "Psychotic Reactions. A Result of the Break-down of Defense by Denial." *Archives of General Psychiatry* 4 (February): 119–23.
- Seth, Anil K., and Tim Bayne. 2022. "Theories of Consciousness." *Nature Reviews. Neuroscience* 23 (7): 439–52.
- Singer, Jerome L. 1975. "Navigating the Stream of Consciousness: Research in Daydreaming and Related Inner Experience." *The American Psychologist* 30 (7): 727–38.
- Søndergaard, Anna, Martin Korsbak Madsen, Brice Ozenne, Sophia Armand, Gitte Moos Knudsen, Patrick Macdonald Fisher, and Dea Siggaard Stenbæk. 2022. "Lasting Increases in Trait Mindfulness after Psilocybin Correlate Positively with the Mystical-Type Experience in Healthy Individuals." *Frontiers in Psychology* 13 (October): 948729.
- Sorokin, Pitirim A., and Irving Louis Horowitz. 2017. "How Famine Influences Our Behavior." *Man and Society in Calamity*. <https://doi.org/10.4324/9780203786604-4>.
- Soui, Nobuaki. 1991. *Bright Light Effect on Vividness of Visual Imagery of Dream*. City College of New York.
- Spiegel, David. 2013. "Tranceformations: Hypnosis in Brain and Body." *Depression and Anxiety* 30 (4): 342–52.
- Spiegel, D., and E. Cardena. 1990. "New Uses of Hypnosis in the Treatment of Posttraumatic Stress Disorder." *The Journal of Clinical Psychiatry* 51 Suppl (October): 39–43; discussion 44–46.
- Stanley, M. A., S. M. Turner, and J. W. Borden. 1990. "Schizotypal Features in Obsessive-Compulsive Disorder." *Comprehensive Psychiatry* 31 (6): 511–18.
- Stein, Leslie. 2018. *Working with Mystical Experiences in Psychoanalysis: Opening to the Numinous*. Routledge.
- Steinnes, Kamilla Knutsen, Johanna Katarina Blomster, Beate Seibt, Janis H. Zickfeld, and Alan Page Fiske. 2019. "Too Cute for Words: Cuteness Evokes the Heartwarming Emotion of Kama Muta." *Frontiers in Psychology* 10 (March): 387.
- Stembridge, Helen Brough. 1972. "Enhancing Creativity by Practice in Free Association While in a Hypnagogic State." <https://uh-ir.tdl.org/handle/10657/11466>.
- Stern, W. C., F. P. Miller, R. H. Cox, and R. P. Maickel. 1971. "Brain Norepinephrine and Serotonin Levels Following REM Sleep Deprivation in the Rat." *Psychopharmacologia* 22 (1): 50–55.
- Stoléru, Serge. 2014. "Reading the Freudian Theory of Sexual Drives from a Functional Neuroimaging Perspective." *Frontiers in Human Neuroscience* 8 (March): 157.
- Stoliker, Devon, Gary F. Egan, Karl J. Friston, and Adeel Razi. 2022. "Neural Mechanisms and Psychology of Psychedelic Ego Dissolution." *Pharmacological Reviews* 74 (4): 874–915.
- Storr, Anthony. 1991. *The Dynamics of Creation*. Penguin Books.
- . 1996. *Feet of Clay: Saints, Sinners, and Madmen : A Study of Gurus*. Free Press.
- Stumbrys, Tadas, Daniel Erlacher, Melanie Schädlich, and Michael Schredl. 2012. "Induction of Lucid Dreams: A Systematic Review of Evidence." *Consciousness and Cognition* 21 (3): 1456–75.
- Tagliazucchi, Enzo, Leor Roseman, Mendel Kaelen, Csaba Orban, Suresh D. Muthukumaraswamy, Kevin Murphy, Helmut Laufs, et al. 2016. "Increased Global Functional Connectivity Correlates with LSD-Induced Ego Dissolution." *Current Biology: CB* 26 (8): 1043–50.
- Tallis, F. 1996. "Compulsive Washing in the Absence of Phobic and Illness Anxiety." *Behaviour Research and Therapy* 34 (4): 361–62.
- Taylor, Isaac. 1829. *Natural History of Enthusiasm [by I. Taylor]*.
- Terr, Lenore C., John F. McDermott, Ronald M. Benson, Peter Blos Jr, John M. Deeney, Rita R. Rogers, and Joel P. Zrull. 2005. "Moments in Psychotherapy." *Journal of the American Academy of Child and Adolescent Psychiatry* 44 (2): 191–97.
- Tierney, Adrienne L., and Charles A. Nelson 3rd. 2009. "Brain Development and the Role of Experience in the Early Years." *Zero to Three* 30 (2): 9–13.
- Timmermann, Christopher, Leor Roseman, Michael Schartner, Raphael Milliere, Luke T. J. Williams, David Erritzoe, Suresh Muthukumaraswamy, et al. 2019. "Neural Correlates of the DMT Experience Assessed with Multivariate EEG." *Scientific Reports* 9 (1): 16324.
- Tonna, Matteo, Carlo Marchesi, and Stefano Parmigiani. 2019. "The Biological Origins of Rituals: An Interdisciplinary Perspective." *Neuroscience and Biobehavioral Reviews* 98 (March): 95–106.

- Vaitl, Dieter, Niels Birbaumer, John Gruzelier, Graham A. Jamieson, Boris Kotchoubey, Andrea Kübler, Dietrich Lehmann, et al. n.d. "Psychobiology of Altered States of Consciousness." *Psychological Bulletin* 131 (1): 98–127.
- Van Cappellen, Patty, and Vassilis Saroglou. 2012. "Awe Activates Religious and Spiritual Feelings and Behavioral Intentions." *Psychology of Religion and Spirituality* 4 (3): 223–36.
- Viol, A., Fernanda Palhano-Fontes, Heloisa Onias, Draulio B. de Araujo, and G. M. Viswanathan. 2017. "Shannon Entropy of Brain Functional Complex Networks under the Influence of the Psychedelic Ayahuasca." *Scientific Reports* 7 (1): 7388.
- Wesselman, Henry B., and S. Don Norman. 1997. "Hyperaroused States as a Gateway to Transcendent Experience." *PsycEXTRA Dataset*. <https://doi.org/10.1037/e719152011-044>.
- Whitfield-Gabrieli, Susan, Heidi W. Thermenos, Snezana Milanovic, Ming T. Tsuang, Stephen V. Faraone, Robert W. McCarley, Martha E. Shenton, et al. 2009. "Hyperactivity and Hyperconnectivity of the Default Network in Schizophrenia and in First-Degree Relatives of Persons with Schizophrenia." *Proceedings of the National Academy of Sciences of the United States of America* 106 (4): 1279–84.
- Williamson, Ann. 2019. "What Is Hypnosis and How Might It Work?" *Palliative Care* 12 (January): 1178224219826581.
- Wolff, Max, Ricarda Evens, Lea J. Mertens, Michael Koslowski, Felix Betzler, Gerhard Gründer, and Henrik Jungaberle. 2020. "Learning to Let Go: A Cognitive-Behavioral Model of How Psychedelic Therapy Promotes Acceptance." *Frontiers in Psychiatry / Frontiers Research Foundation* 11 (February): 5.
- Wolf, Thomas Gerhard, Sina Schläppi, Carla Irene Benz, and Guglielmo Campus. 2022. "Efficacy of Hypnosis on Dental Anxiety and Phobia: A Systematic Review and Meta-Analysis." *Brain Sciences* 12 (5). <https://doi.org/10.3390/brainsci12050521>.
- Wolin, S. J., and N. K. Mello. 1973. "The Effects of Alcohol on Dreams and Hallucinations in Alcohol Addicts." *Annals of the New York Academy of Sciences* 215 (April): 266–302.
- Yazaki, N. 1992. "Regression in Schizophrenia and Its Therapeutic Value." *The Japanese Journal of Psychiatry and Neurology* 46 (1): 71–98.
- Young, Simon N., and Marco Leyton. 2002. "The Role of Serotonin in Human Mood and Social Interaction. Insight from Altered Tryptophan Levels." *Pharmacology, Biochemistry, and Behavior* 71 (4): 857–65.
- Zhang, Gongliang, and Robert W. Stackman Jr. 2015. "The Role of Serotonin 5-HT<sub>2A</sub> Receptors in Memory and Cognition." *Frontiers in Pharmacology* 6 (October): 225.