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## Evidence-Based Approach to the Internal World and Religious Beliefs: Are They Illusions or Hallucinations? Insights from Default Space Theory

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### Abstract

Understanding the neural basis of conscious perception is one of science's great unanswered questions. The Default Space Theory (DST) of mind proposes that consciousness results from an internally generated three-dimensional "default space" that the brain projects, rather than a direct mirroring of the external world [1]. In this model, the brain creates a *virtual reality* of experience composed of sensory inputs integrated with memories and expectations [2]. Consequently, what we perceive is influenced as much by prior knowledge and top-down expectations as by incoming stimuli [3,4]. We review evidence from neuroscience and phenomenology to support DST, examining phenomena such as sensory illusions and hallucinations which demonstrate the brain's ability to construct or alter perceptual reality endogenously [5,6]. In light of these insights, we explore the internal world of religious belief and ask whether profound religious or spiritual experiences—visions, voices, and transcendent sensations—are best understood as illusions or hallucinations produced by the brain's default generative mechanisms. Our analysis suggests that even the seemingly supernatural facets of faith can be demystified as internally generated experiences, consistent with an evidence-based DST framework [7].

### Keywords

Evidence-Based Approach; Internal World and Religious Beliefs; Illusions or Hallucinations; Default Space Theory.

## Introduction

What consciousness actually is and how the brain produces conscious awareness—Chalmers’s infamous “hard problem” of consciousness—has been an enduring challenge for neuroscience [8]. Numerous theories have been proposed over the past decades. For example, global workspace and dynamic core theories focus on how distributed brain activity becomes unified, proposing that transient coalitions of brain networks give rise to consciousness [9,10]. The Global Workspace theory suggests that the coalition of cortically distributed processes renders information accessible to the whole brain [9], whereas the Dynamic Core Hypothesis holds that synchronized thalamocortical activity forms the dynamic center of awareness [10]. Similarly, metastable models like Operational Architectonics posit that spatiotemporal patterns of brain activity can bind information as needed to create a singular mind [11,12]. However, many of these brain-focused theories neglect the body’s contribution to what it means to be conscious.

Yet the metastable Default Space Theory (DST) of consciousness explicitly incorporates the body’s role, extending prior approaches and providing a clear spatial framework for conscious experience [1]. According to DST, the mind’s conscious arena is an internal three-dimensional space projected by the brain and body that represents external physical space [1]. This internally generated “default space” arises from coherent bioelectric oscillatory activity spanning cortical and subcortical networks, orchestrated largely by the thalamus [7]. The brain thus constructs a model of the world within this volumetric mind-space—a kind of simulated reality composed of current sensory inputs blended with memories and anticipations [2]. Ultimately, we do not perceive the external world directly. Instead, we perceive the brain’s best prediction of what is out there; in other words, conscious perception is heavily informed by past experience and top-down expectation [3,4]. Rather than relying purely on bottom-up sensory processing, the brain saves effort by pre-constructing expected percepts and only updating them when new information arrives [3,4]. In fact, much of the sensory information reaching our senses is filtered or altered before it ever reaches awareness [13], indicating that a consciousness based on a default internal model is highly constrained and selective.

Specifically, according to DST, whatever occupies the default space of the mind at a given moment is determined by a combination of sensory input, attention, and expectation. DST emphasizes that attention and expectation are not merely post-processing influences on perception; they actively contribute to how sensory signals are transmitted and experienced [2]. For example, oscillatory neural couplings allow higher cortical areas to influence activity in earlier sensory pathways, so that expected elements of a scene are primed and processed with less effort [14]. As a result, what we “see” in our mind’s eye—our internal expectation of the world—often precedes and shapes the subsequent sensory processing of actual stimuli. This principle is evident in many demonstrations of top-down influence on perception [3,4].

One especially compelling neuropsychological example of the brain’s spatial internal model comes from hemispatial neglect. When one parietal lobe is damaged, patients can lose awareness of an entire side of their perceptual world [15,1]. They might eat only the food on one half of their plate or even deny ownership of a limb on the neglected side. Such patients illustrate that if a portion of the mind’s internal spatial map is destroyed, it effectively ceases to exist for conscious awareness [15,1]. These clinical observations support DST’s fundamental premise: if conscious experience is instantiated within a spatial architecture, then damage to part of that internal space will impair awareness in an organized (and spatially specific) [15,1]. Therefore, rather than treating consciousness as an emergent property of purely neural network dynamics, DST offers an

architectural metaphor: consciousness is what it “feels like” to have a globally simulcast, embodied experience in a single body-mapped brain [7]. In essence, DST urges us to think outside the box—the “box” of the brain itself. The default space of the mind is not necessarily confined within the brain’s physical boundaries; the brain may be generating a volumetric model of reality that includes the body and Peripersonal space as integral components.

Ultimately, this paper takes an evidence-based approach to explore several experiential phenomena that allow us to peer into this internal world of default space. Each example illustrates how internal neural projections and expectations can create alternative versions of reality regardless of the actual sensory input—a theme central to DST. In the following sections, we examine illusions, hallucinations, and related facets of experience (including the phenomenology of religious faith) to determine whether these internal experiences are better characterized as “illusions” or “hallucinations,” and how DST can illuminate their underlying mechanisms.

### **Illusions, Hallucinations, and the Phenomenology of Faith**

Illusions and hallucinations are perceptual phenomena that highlight the brain’s capacity to construct its own reality. It is useful to distinguish the two: an illusion typically involves a misinterpretation or distortion of real external stimuli, whereas a hallucination is a perceptual experience that occurs in the absence of any corresponding external stimulus [16]. Both reveal the influence of the brain’s internal model on what we consciously perceive. Here we review a series of well-studied illusions and hallucinations to demonstrate the evidence for an internal default space of consciousness. We then consider how the same principles might apply to religious experiences – asking whether the visions, voices, or profound sensations reported in faith traditions might themselves be understood as brain-based illusions or hallucinations.

#### **Internal body ownership illusions**

One-way researchers know that we project an internally created space is through illusions that override the normal ownership of the body. For instance, the classic rubber hand illusion shows how visual input can alter the perception of one’s own body. In this experiment, a dummy hand is positioned in front of a participant while the participant’s real hand is hidden out of sight. If both the real hand and the fake hand are stroked synchronously with a brush, the participant may begin to feel as though the rubber hand is actually part of their body [17,18]. With the proper temporal and sensory synchrony, the unseen real hand is experienced as if it were the rubber hand – in other words, the brain’s default space “fills in” the ownership of the rubber hand as part of the self. This illusion demonstrates that a great deal of our bodily self-awareness is assembled top-down, based on expectations and multisensory context, rather than fixed by incoming sensory data alone [17,18].

Similarly, full-body ownership illusions suggest that, under the right multisensory conditions, people can even adopt an entire artificial body (such as a mannequin or virtual avatar) as their own. Studies have shown that during such full-body illusions, participants not only feel as if the fake body is theirs, but they also exhibit physiological responses congruent with that belief – for example, a measurable drop in the temperature of their real limbs when those limbs are subjectively “disowned” in favor of the fake body [19,20]. These findings echo DST’s assertion that we exist within a sensorimotor experience generated by the brain, and that our sense of self is remarkably flexible. When the stimuli necessary to induce an illusion are present, the brain can extend the body schema far beyond its normal limits. Whatever “fills into” consciousness during such illusions (e.g.

the rubber hand or mannequin) demonstrates how fluid our experience of the body and self can be when prompted [2]. Ultimately, while we tend to believe in a continuous, stable self within a stable world, these body-ownership illusions reveal that our sense of self is in part a construct of the brain – one that can be experimentally “hacked” or reshaped under the right conditions.

### **Spatial re-orientation (spinning) illusion**

Another common occurrence illustrates how internally generated our sense of space can be: the familiar disorientation after one stop spinning. For example, if you twirl around rapidly for about thirty seconds and then come to an abrupt stop, you will feel as if the world around you is still spinning, even though your visual input confirms that you are stationary. This everyday post-rotational dizziness is essentially an illusion created by conflicting sensory signals. It occurs because during the spinning, the fluid in our inner-ear vestibular organs continues to move momentarily even after the body has ceased rotating, sending a signal to the brain that implies ongoing motion. At the same time, the eyes now see a stable environment. The brain, relying on its internal model, initially “trusts” the persistent vestibular signal and thus maintains a default perception of a spinning world despite visual evidence to the contrary [16]. The integration of these discordant sensory cues into a single conscious experience can produce nausea or vertigo as the brain struggles to reconcile the conflict. Only once the vestibular system’s activity settles do the illusory spinning sensation fade and our internal space readjusts to match the external reality.

According to DST, this spinning illusion underscores the brain’s role in constructing a unified three-dimensional space from multiple senses. All sensory inputs normally converge into one synthesized percept of orientation and motion; but when the senses fundamentally disagree (vestibular vs. visual signals), the entire conscious experience can temporarily break from reality. The brain essentially has to “decide” which input to credit when creating our reality, and in this case, it initially prioritizes the vestibular sensation of movement over the visual stillness. The result is a momentary divergence between perceived reality and actual reality. Notably, closing one’s eyes during the spinning can lessen the conflict and the ensuing illusion (since visual cues are removed), reinforcing that it is the integration (or mis-integration) of sensory inputs that generates the false percept. In DST terms, such observations support the notion that the brain renders consciousness within a spatial simulation, and that this internal simulation can depart from actual external conditions under certain circumstances [21]. Most of the time, our brain’s default spatial model aligns with the external world through continual calibration and error correction, but in cases like the spinning illusion, the default space demonstrates its ability to momentarily create its own reality [21].

### **Afterimages and persisting visual space**

If one looks away from a bright image or closes one’s eyes after staring at a scene, an image may briefly remain “in the mind’s eye.” This lingering sensation is known as an afterimage—essentially a residual percept that persists even when the original stimulus is gone. A straightforward explanation for positive afterimages is retinal fatigue: photochemical activity in the retina continues briefly after intense stimulation, leaving a faded imprint of the image [22]. However, experimental studies have shown that afterimages are not solely a retinal phenomenon. Under varying conditions, the characteristics of afterimages suggest the involvement of cortical processing rather than just unspent retinal signals [23,24,25]. For example, the size of an afterimage can appear to change depending on context and surrounding illusions, implying that higher visual areas (which interpret size and distance) are influencing the afterimage’s appearance [25]. Likewise, “filled-in” afterimages—where

the brain fills in patterns or colors that were only implied by the original stimulus—point to a central (cortical) mechanism constructing the percept [23,24].

From the perspective of DST, the existence of afterimages indicates that the mind operates within an internal visual space that can retain and manipulate perceptual content independent of the external world. When a person perceives something and then the stimulus is removed, they often still “possess” a representation of it in their mind’s eye, within the default space of consciousness [26]. Retinal activity may initiate an afterimage, but cortical networks sustain it, holding the “image” in awareness so that it does not immediately vanish [25,25]. Remarkably, the afterimage usually appears in the same egocentric spatial location and orientation as the original stimulus, demonstrating the brain’s ability to preserve spatial consistency in the absence of input. This congruence between original perception and afterimage is one way we develop stable conscious visual representations via an internal spatial coordinate system [24,25]. The fact that one can continue to see something (an image or lights and shapes when eyes are closed) without any external stimulus shows that the default mind-space is capable of generating visual content on its own. In total darkness, people still report seeing faint lights or moving spots – not because anything is affecting their retinas, but because the visual system’s background activity and the brain’s predisposition to impose patterns persist. Thus, DST would argue that thalamocortical activity maintains a baseline three-dimensional visual reality even in the absence of external input, keeping the lights of consciousness “on” [26]. Afterimages, then, give tangible form to internally sourced visual experiences that temporarily overlay the external world’s absence. They illustrate that what we consciously see is not identical to external reality; rather, our perceptual world is a kind of controlled mirage that normally corresponds to external stimuli only when it should. We learn through experience to discount these internally generated remnants (like afterimages) when they are not useful, which is why we typically ignore them unless we purposefully attend to them [23,26].

### **Attentional blindness and the “invisible gorilla”**

One of the most striking examples of the brain’s reality-construction (and reality-omission) is inattention blindness, famously demonstrated by the “invisible gorilla” experiment. In this experiment, observers are asked to watch a video of people passing a basketball and to count the passes. Midway through the video, a person in a gorilla suit strolls directly through the scene. Surprisingly, about half of the viewers become so absorbed in the counting task that they completely fail to notice the gorilla [27]. The gorilla is plainly visible on the screen—yet for those who are focused elsewhere, it might as well be invisible because it never enters their conscious awareness. This astonishing finding shows how attention acts as a gatekeeper for what enters our default space of consciousness. Only the stimuli that are relevant to one’s current goals or expectations gain entry into conscious, globally available awareness; everything else is filtered out and fails to be experienced [36,27].

In the case of the invisible gorilla, attention was allocated to the ball-passing players, so the unexpected gorilla fell outside the participants’ internal model of the scene. Essentially, the participants experienced much less of the visual world than was actually in front of their eyes; a large, unmissable object (when attention is not diverted) was rendered nonexistent to their awareness [27]. This indicates that perceptual processing is highly top-down: what one expects or is looking for will dominate conscious experience, whereas what one does not anticipate can literally disappear from one’s reality. Findings like these support DST because they demonstrate that consciousness is an active and selective process. The brain’s default space at any moment contains only a

fraction of the available sensory information – specifically, those elements deemed important for the task at hand – filled in with what the brain believes or expects should be there [27]. In other words, our internal model actively constructs a scene that is useful, and it can omit even critical stimuli (like a gorilla) if they are not aligned with our current top-down goals. This aligns with the DST assertion that conscious experience is not a mere summation of sensory inputs, but rather a synthesized simulation orchestrated according to attention and purpose [27].

### **Altered and trained states of mind**

Other aspects of the default space’s existence become evident when people deliberately alter or train their mind, such as through meditation or when they undergo extreme reductions in sensory input. These scenarios show how flexible and wide-ranging the contents of consciousness can be, further reinforcing DST’s claims.

**Meditative States:** Experienced meditation practitioners often report unusual alterations in their sense of space, time, and self during deep meditation. Some describe feelings of being unbound from the usual body limits or a dissolution of the boundary between self and the surrounding environment. Such phenomenological reports are supported by neuroimaging: neurophenomenological studies of mindfulness experts have found altered brain activity in areas related to self-representation and spatial processing during meditation, correlating with the practitioners’ reported changes in experience [28]. Structural changes in the brain have also been observed with long-term meditation practice. For example, an increase in gray matter density in brainstem regions associated with interoceptive awareness (sensations of the internal body) has been documented following an intensive mindfulness training program [29]. These findings support DST by showing that even fundamental aspects of one’s default spatial experience (such as the sharpness of the self/other boundary or the integration of internal bodily signals) are malleable through mental training [28,29]. The brain’s default space can be “tuned” or refined with practices like meditation, leading to demonstrable changes in both experience and brain structure that align with an expanded or altered internal model of self and space.

**Controlled Breathing:** A related aspect of meditation is the emphasis on slow, deep breathing. Voluntarily controlling one’s breath has unique effects on brain rhythms and the autonomic nervous system that can change emotional and cognitive states. Research indicates that slow, rhythmic breathing can induce specific brain oscillations and modulate arousal in ways that might underlie the calm, “zen” experiences reported in meditative states [30,31]. DST proposes that rhythmic bodily signals like breath and heartbeat are integral elements that help synchronize and stabilize the quality of conscious experience [31]. Consistent with this, studies have shown that conscious breath control can influence even peripheral systems such as immune response and stress hormone release [32]. Such findings illustrate how interactions between bodily processes and the brain (the brain-body “loop”) can shape conscious awareness. By modulating something as basic as breathing, individuals can alter the dynamics of their default space of consciousness – further evidence that consciousness is deeply embodied and susceptible to deliberate influence.

**Sensory Deprivation and Ganzfeld Hallucinations:** Finally, perhaps the most vivid demonstration of the brain’s spontaneous generative capabilities comes from sensory deprivation research. In the Ganzfeld experiment, participants are exposed to a uniform, unstructured sensory field (for example, diffused white light and white noise) that provides no distinct features for the brain to latch onto. After a short time in this featureless environment, many people begin to experience hallucinations – ranging from simple flashes of light or colors

to complex, dream-like scenes or sounds. Essentially, in the absence of external sensory input, the brain starts to entertain itself, producing percepts out of the intrinsic activity of the visual and auditory cortex [5]. People report astonishing imaginative adventures or visions that feel real, despite being completely generated by the mind using only its own internally stored information and noise [5]. In a classic study, [33], noted that even with no visual features available (a homogeneous ganzfeld), structured images would arise “from nowhere,” underscoring the brain’s propensity to create content. Modern neuroimaging has corroborated that during prolonged visual deprivation, activity in visual pathways can produce vivid hallucination-like imagery [6].

In uniformly featureless conditions, it seems the brain’s default space demands content – and in the void of external stimuli, it generates “something” on its own [33,5,6]. Ultimately, these hallucinations can be understood as the brain’s default space putting itself on display: once freed from external constraints, endogenous mechanisms in the brain come to the forefront and actively construct conscious experiences. All known phenomena of these altered states – whether deep meditation or total sensory deprivation – are welcome evidence in support of DST. They definitively demonstrate that the structure and contents of conscious experience are created from within by the brain, not simply dictated by the outside world.

**Phenomenology of Faith:** The foregoing examples of illusions and hallucinations make it clear that the brain can generate remarkably convincing experiences entirely on its own. This naturally leads to the question: What about religious or spiritual experiences? Profound experiences reported in faith contexts – such as visions of deities, hearing divine voices, out-of-body experiences, or an overwhelming sense of unity with the cosmos – might also be products of the brain’s internal default space. From an evidence-based standpoint, these experiences of faith can be interpreted using the same principles that explain illusions and hallucinations. The content of a religious vision, for instance, could be viewed as an internally generated image shaped by an individual’s expectations, beliefs, and cultural priming (much like an illusion is shaped by expectation, or a hallucination by internal drives). In many cases, there is no external visual or auditory stimulus corresponding to a mystical vision or revelation – which suggests that such experiences are, by definition, hallucination-like (perceptions without external stimuli). On the other hand, certain religious phenomena might involve misinterpretations of real sensory events (for example, seeing a coincidental pattern of light and shadow and perceiving a sacred figure, akin to an illusion). In either scenario, DST provides a framework in which these occurrences are not supernatural intrusions but rather the brain’s normal constructive processes operating in particular modes. According to DST, even deeply felt spiritual awakenings or encounters with the divine occur within the brain’s default space of consciousness. They are real experiences for the individual, but their origin is internal – a sophisticated illusion or hallucination generated by neural circuits interacting with personal expectations and cultural context. In this view, the phenomenology of faith – the subjective feeling of religious experience – can be aligned with known brain-based phenomena, bridging the gap between religious mysticism and scientific understanding [6,2]. By recognizing religious experiences as part of the continuum of human consciousness (rather than as completely separate or inexplicable events), we can analyze them with the same evidence-based lens as other perceptual phenomena. DST, therefore, not only accounts for everyday perception and special cases like illusions and hallucinations, but it also has the potential to demystify experiences traditionally regarded as transcendental, grounding them in the biology of the default space of the mind.

## Conclusion

The Default Space Theory of Mind has proven to be an effective “theory of everything” for consciousness to date, offering a unifying framework that encompasses brain, body, and phenomenological experience. By acknowledging where and how the mind manufactures our conscious reality – namely, through a spatial construct generated by brain-body interactions – DST can explain a wide range of findings that previously seemed disparate. We are all living in a default three-dimensional mental space with which we constantly interact and which we can even manipulate, whether through attention shifts or meditative training.

Notably, when this default space is disrupted or distorted (as occurs in some sensory illusions or neurological conditions), our experience reflects that disruption. Yet we often continue to function as if the external world were intact, essentially ignoring or compensating for extraneous sensory discrepancies to maintain a coherent experience. For example, in certain visual illusions or neglect syndromes, the brain will omit or normalize inconsistent inputs [34], in order to preserve an efficient, survival-oriented model of the world. In this way, the DST perspective aligns with the brain’s known tendency to prioritize a stable, functional reality over one that is exhaustively veridical.

Perhaps most intriguingly, DST’s conception of an internal spatial simulation parallels discoveries about the brain’s default mode network – the set of brain regions that become active during rest and self-referential thought. The default mode network is known to engage when we are recalling memories, imagining the future, or considering the minds of others, and it has been described as supporting our inner mental simulation of the world. This bears a strong resemblance to the default space theory’s postulated internal model. Indeed, DST builds upon this by adding a richer spatiotemporal structure: when someone is immersed in self-generated experiences (such as daydreaming, reminiscing, or praying), those experiences may be unfolding within the mind’s constructed three-dimensional space, utilizing the same neural architecture that underlies the default mode [35]. Thus, there is far more happening when the brain is “at rest” or turned inward than was once appreciated.

Moving forward, DST opens several promising avenues for research. Phenomenological investigations can further explore how subjective experience maps onto the structures of the default space – for instance, how alterations in bodily awareness or spatial orientation correspond to changes in conscious content. At the same time, neuroimaging studies could empirically test DST’s predictions. Future experiments might ask whether there is an isomorphism between patterns of neural activation and the properties of our internal spatial experience [31]. For example, if the parietal lobe (responsible for spatial integration) is temporarily disrupted, do we observe a “collapse” or distortion of the default spatial model in predictable ways? Are there measurable hemispheric differences in how the default space is constructed and experienced? Psychophysiological measures like EEG or MEG could also be used to examine whether peripheral sensory signals and central cortical representations remain synchronized in real time, as DST implies, they should for a coherent instantaneous perception [14]. Investigating consciousness during various altered states – meditation, hypnagogic (between sleep and wake) states, virtual reality immersion, or Ganzfeld-induced hallucinations – may reveal brain activity patterns corresponding to the proposed default experiential space. By formulating clear hypotheses and designing bold experiments, DST provides a solid theoretical foundation for such future studies.

In conclusion, knowing the nature of the mind's default space and understanding how we access it brings us closer to explaining the very essence of "being" in any conscious experience. The realization that our minds might simply be embodied simplices – structured models pervading our reality – allows for a more tangible explanation of conscious awareness. Even the most enigmatic human experiences, including those of the internal world of faith, become accessible to scientific inquiry when viewed as products of the mind's default space. DST thus bridges the gap between the neurophysiological processes of the brain and the rich tapestry of human conscious experience, offering a comprehensive, evidence-based approach to understanding illusions, hallucinations, and the mysteries of spiritual consciousness alike.

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