



The Inebriate's New Life: Finding a Spiritualized Mind Linked to Geneospirituality

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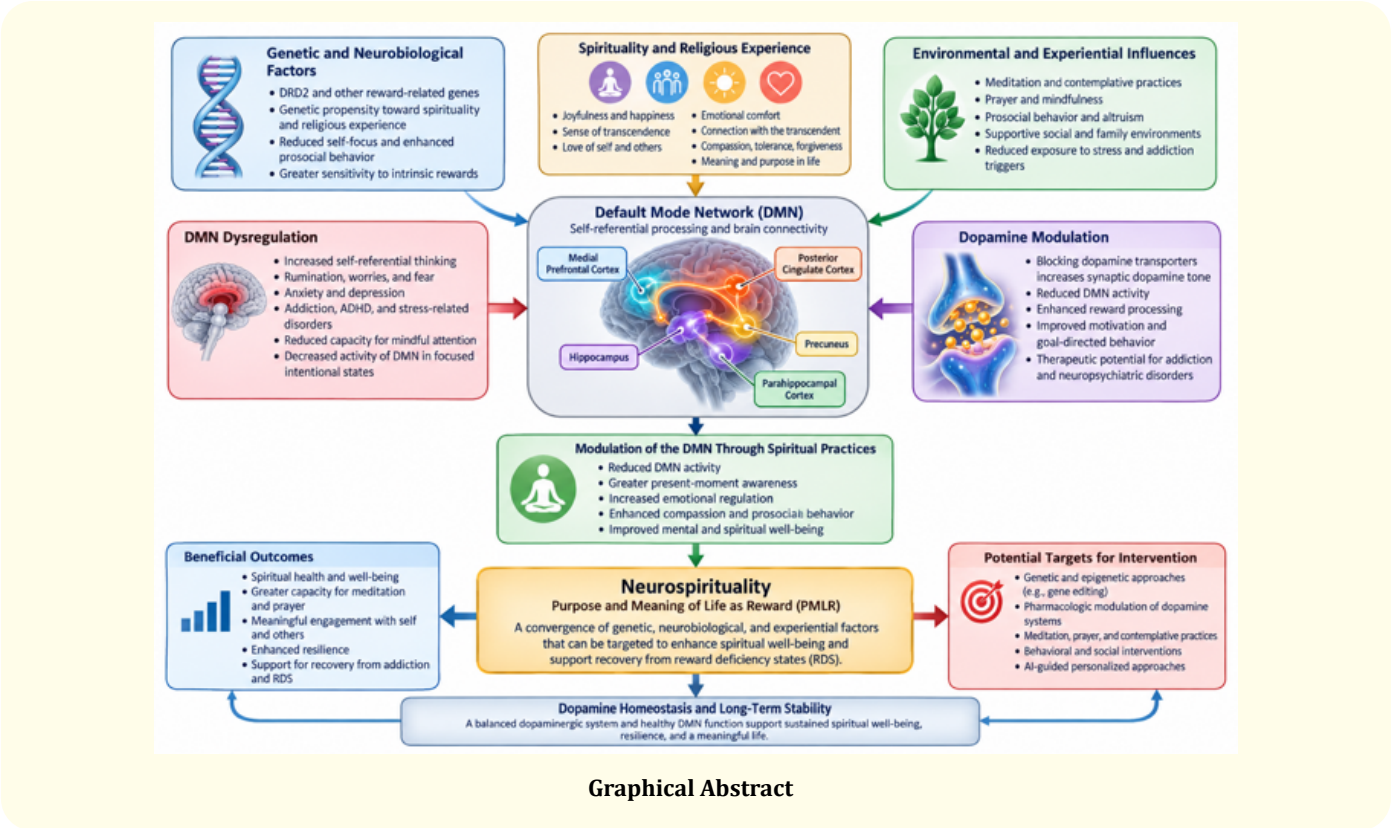
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Abstract

This editorial considers spirituality from a neurobiological perspective and examines a provocative question: could, or should, emerging genetic technologies ever be used to influence spiritual or religious experience (gene-spirituality) in ways that might help people cope with major social and personal stressors? We review proposed links among spirituality, reward-related genes, hypodopaminergic states described within Reward Deficiency Syndrome (RDS), the mirror-neuron system, and the default mode network (DMN). We also discuss addiction-medicine approaches that may support the neuro-spirituality connectome, a construct associated with Purpose and Meaning of Life as Reward (PMLR), as potential avenues for improving reward regulation and modulating DMN activity. Finally, we consider whether future combinations of gene-editing technologies and artificial intelligence could give rise to forms of “artificial geneospirituality” in recovery settings, and whether such an approach would be ethically acceptable or instead pose unacceptable risks to autonomy and human dignity.

Keywords: Purpose and Meaning of Life as Reward (PMLR)



Preamble

Inebriety: Its Source, Prevention, and Cure — Charles Follen Palmer (1898)

Charles Follen Palmer’s 1898 volume, *Inebriety: Its Source, Prevention, and Cure*, is a medical and moral discussion of

alcoholism that is now available in the public domain through digital archives. Published by F. H. Revell Company, the 109-page text blends contemporary medical thinking with social and ethical commentary. Palmer, a physician and temperance advocate, portrayed inebriety as having both bodily and moral dimensions, discussed what he termed a “neuro-psychopathic constitution,”

and emphasized prevention and early intervention, including an idea that resembles what would now be called preaddiction.

Introduction

More than a century ago, Charles Follen Palmer's *Inebriety: Its Source, Prevention, and Cure* raised questions that remain recognizable in modern addiction science. He distinguished inherited susceptibility from acquired forms of alcohol misuse and described the family as both a potential source of support and, under some circumstances, an environment that could encourage alcohol-seeking behavior. Palmer proposed that some individuals carried a familial or constitutional predisposition that could become evident even in the absence of obvious external temptation. He defined heredity broadly as the ancestral influences present at birth, after which the individual is shaped by the "hygiene or environment of life." Although his discussion of multigenerational transmission was limited by the science of his era, he nevertheless argued for identifying vulnerability as early as possible. His description of a "preinebriate morbid condition" anticipated modern interest in preaddiction and supported intervention during youth when risk was apparent. Palmer also depicted recovery as a profound transformation, progressing toward a "new life" and eventually a "spiritualized mind." Read through a contemporary lens, his sequence can be reframed as inherited vulnerability, family history and environment, early risk recognition, preventive intervention, established addiction, physical restoration, and psychosocial or spiritual renewal. Modern RDS research extends this historical observation by examining DRD2 and other reward-related biology, brain reward circuitry, and Reward Deficiency Syndrome as candidate mechanisms underlying vulnerability rather than merely documenting familial patterns after addiction has emerged. In this updated framework, the trajectory becomes vulnerability, risk assessment, early identification, prevention, recovery, and the pursuit of dopamine homeostasis and neurowellness.

Spirituality also warrants consideration in discussions of biomedical enhancement. Contemporary societies face recurrent stressors including climate-related disasters, terrorism, war, displacement, and pandemic-related disruption, all of which intensify interest in biological and behavioral approaches to resilience and well-being. Against that background, an unresolved ethical question is whether genetic technologies should ever be used to alter the capacity for spiritual or religious experience [2,3].

Genetic engineering is increasingly discussed in relation to a wide range of human traits. In animal work, for example, Tucker, *et al.* showed that targeted genetic manipulation can modify locomotor activity, metabolism, adiposity, body weight, and longevity-related phenotypes [4].

Possible?

Evolutionary change is not determined only by shifts in the frequency of DNA variants. Patterns of gene expression are also shaped by RNA-mediated regulation and by developmental and environmental conditions. Although a gene is carried throughout the life of an organism, the products it generates depend on when and where regulatory signals activate or suppress its expression. These signals may arise from internal developmental processes or from external exposures and are not themselves encoded solely by the underlying DNA sequence. Learned behaviors are therefore not equivalent to inherited genetic traits, although culturally transmitted behaviors can still influence survival and reproduction and thereby become subject to evolutionary selection [5].

Genome-editing methods such as CRISPR have prompted speculation that traits related to religiosity or spiritual sensitivity might eventually become technically modifiable [3,6]. In principle, if reproducible biological determinants of such traits were ever identified, one could imagine correcting, altering, or reprogramming relevant molecular pathways. At present, however, the idea of a discrete defective "spirituality gene" remains hypothetical, and any proposal to engineer spiritual or religious behavior would require evidence far beyond currently available association studies.

Identifying spirituality genes

Dopaminergic signaling has long been linked to reward, positive affect, and stress modulation [7]. In earlier work, Blum and colleagues [8] discussed Hamer's proposal [9] that genetic influences on dopaminergic function might contribute to dispositional optimism and, indirectly, to aspects of spirituality. Optimism has in turn been associated with persistence, adaptive coping, and favorable health-related outcomes, providing one possible pathway by which reward biology could intersect with spiritually meaningful experience [10].

Comings and colleagues examined whether variation in the dopamine D4 receptor gene (DRD4) might relate to personality

dimensions that include spirituality [10]. DRD4 has also been studied in relation to novelty seeking [11]. In substance-using populations, associations were reported between DRD4-related variation and Self-Transcendence, although the expected relationship with novelty seeking was not consistently observed [12]. Comings additionally reported that higher Self-Transcendence scores were associated with a lower likelihood of alcohol or drug abuse in the studied sample [13].

Nilsson, *et al.* [14] studied Self-Transcendence and the Spiritual Acceptance subscale in 200 participants matched on age, sex, and risk-related characteristics. Their analyses included the serotonin transporter polymorphism 5-HTTLPR and AP-2beta-related genotypes. In boys, Self-Transcendence and Spiritual Acceptance showed an inverse relationship with the short 5-HTTLPR variant and a positive relationship with the short AP-2beta genotype. The investigators also reported genotype-by-genotype interactions for self-transcendence and spiritual acceptance across boys and girls. Participants homozygous for the long AP-2beta genotype in combination with the short 5-HTTLPR variant had comparatively lower scores on these measures [14].

Borg and colleagues reported associations between serotonergic biology and measures of self-transcendence and spiritual acceptance. Their findings included relationships involving the serotonin 1A receptor system, ethanol-binding measures, and serotonin-related markers among individuals with higher self-transcendence scores [15]. Bachner-Melman, *et al.* [16] likewise contributed to the broader hypothesis that serotonergic neurotransmission may participate in aspects of religious or spiritual experience, although such observations do not imply a single biological pathway for spirituality.

Comings proposed that the rewarding qualities of dopaminergic signaling may help explain why religious belief or spiritual practice can provide comfort, positive affect, and a sense of well-being for many people, thereby contributing to the enduring importance of spirituality in human life [13].

Desirable?

If biological technologies could enhance traits associated with spirituality, the effects might not be limited to spiritual experience itself. One theoretical possibility is that stronger prosocial or transcendent orientations could reduce preoccupation with status,

material reward, or self-focused behavior. Selfishness, in this context, can be understood as excessive prioritization of one's own interests over those of others. The capacity to represent another person's actions or internal state as personally meaningful has been linked to mirror-neuron circuitry, which may interact with networks involved in self-referential cognition, including the DMN [17].

Mirror neurons

The mirror-neuron system is commonly described as a neural matching mechanism that is engaged both when an action is performed and when a similar action is observed [18]. It has therefore been proposed as one component of the neural architecture supporting social cognition. In an fMRI study of 75 healthy participants completing imitation, empathy, and theory-of-mind tasks, Schmidt, *et al.* observed activation across regions including the inferior frontal gyrus, inferior parietal cortex, fusiform gyrus, posterior superior temporal sulcus, and amygdala. These findings were interpreted as supporting a broad role for mirror-system circuitry in interpersonal understanding [19].

The DMN

The default mode network (DMN) was characterized through observations of coherent low-frequency brain activity and is most prominent during rest rather than externally focused, goal-directed tasks [20]. Core regions commonly assigned to the network include medial temporal structures involved in memory, medial prefrontal regions associated with social and self-referential processing, and the posterior cingulate cortex, which participates in the integration of internally generated thought [21].

The human search for meaning can be considered in the context of the brain capacities that evolved to support survival, social organization, and complex cognition. Herculano-Houzel has argued that expansion in human cognitive capacity created new possibilities for neural connectivity and function [22]. Those same capacities also permit extensive self-referential processing. Under some circumstances, persistent inward focus may become maladaptive and interfere with well-being, a possibility that has drawn attention to the DMN in studies of rumination and affective distress.

Language, autobiographical memory, imagination, and the ability to think about events that are not immediately present

are closely related to the kinds of internally directed cognition associated with the DMN [23]. These functions permit mental time travel, simulation of future events, and the sharing of memories, plans, and abstract ideas. They are central to human cognition, but excessive or poorly regulated self-referential processing has also been associated with worry, anxiety, depressed mood, and uncertainty. DMN activity generally declines during focused, externally directed tasks and increases during rest or mind wandering. This dynamic may help explain why sustained purposeful activity can interrupt repetitive internal thought even when immediate survival needs have already been met.

Within addiction medicine, the relationship among dopamine function, spirituality, and recovery has received less attention than many other neurobiological topics. Gene-spirituality remains a conceptual rather than established therapeutic construct, and genetic engineering for this purpose has not been demonstrated. Nevertheless, spirituality and religiosity have been investigated as recovery-related factors, including their possible relationship to relapse risk [24]. Any biological interpretation should therefore remain distinct from the clinical observation that spiritually meaningful practices may serve as one of several supportive resources during recovery.

Spirituality

Spirituality can be understood as an effort to develop meaning, coherence, connection, and acceptance in the face of experiences that are not always fully explained by ordinary material or empirical frameworks. Definitions vary substantially: some are explicitly religious, whereas others are secular or philosophical. Across these formulations, recurring themes include connection with oneself and others, emotional consolation, purpose, and a sense of transcendence. Human cultures have developed religious, contemplative, and philosophical traditions that provide structured ways of pursuing these aims, and spiritual practices have appeared in diverse forms throughout recorded history.

At its most speculative, the gene-spirituality concept raises the possibility that biological differences influencing spiritual responsiveness could someday be modified. Advocates of this idea have suggested that such enhancement might foster prosocial traits, including empathy and a broader sense of concern for people across ethnic or religious boundaries [2,25]. This remains a theoretical proposition rather than an established biological or clinical capability.

Self-referential cognition is evolutionarily useful because it helps individuals identify threats, rewards, and actions relevant to survival. Yet the same system can become disproportionately focused on acquisition, status, fear, resentment, envy, pride, or other self-centered motivations. These tendencies raise an enduring question: how can adaptive self-protection be balanced against concern for others and a broader sense of meaning? One answer offered by many spiritual traditions is deliberate practice aimed at loosening rigid self-focus and cultivating humility, compassion, and perspective rather than attempting to eliminate the self altogether.

Shamanic traditions provide one example of practices that intentionally alter ordinary states of consciousness [26]. Trance, dream-like states, ritual transformation, and experiences described as journeys to a spiritual realm may be interpreted within those traditions as pathways to contact with transcendent realities. Related ideas have been discussed in the context of dreaming and the subjective experience of revelation, in which an individual interprets an internal experience as communication from a divine source [27].

Buddhist traditions offer a different approach by emphasizing attenuation of attachment to a fixed or dominant sense of self. In principle, reducing excessive ego-centered striving could favor behaviors that are more altruistic, peaceful, principled, and socially cooperative. Research on the neurobiology of spirituality may therefore be relevant not because it proves the truth of any belief system, but because it can help clarify how practices associated with meaning and self-transcendence relate to well-being. The frequently cited example of Bhutan's emphasis on Gross National Happiness illustrates a societal model in which collective well-being is explicitly valued alongside economic achievement [28].

Galanter, in the sixth edition of the Textbook of Addiction Medicine (p. 1101) [29], identifies several domains that may characterize spiritual health among people recovering from addiction:

- Affect
- A sense of wellbeing
- Contentment with one's life circumstances
- Positive affect
- Feelings of support

- Existential variables
- Meaningfulness in one's life.
- Flow
- Ability to use highest strengths and abilities
- Spirituality
- Non-material issues that give personal meaning and purpose in life
- Personality
- Classification of Strengths
- Mutual help participation
- AA or other affiliation

Although these domains are heterogeneous, they converge on several recurring features of spiritual well-being. Love, compassion, tolerance, forgiveness, responsibility, altruism, and kindness all shift attention away from exclusive self-interest. Cultivating humility and pursuing conduct that is experienced as

ethically congruent may therefore produce a more durable sense of well-being than a life organized primarily around acquisition or self-advancement.

Many desired psychological states cannot be produced simply by force of will. A person can deliberately study but cannot command wisdom; can pursue pleasurable experiences without guaranteeing happiness; can behave modestly without automatically becoming humble; and can go to bed without being able to compel sleep [30]. Spiritual well-being may follow a similar paradox. It may emerge less from direct attempts to control internal states than from practices that reduce excessive self-focus, loosen the need to control others or the environment, and increase service to others. One possible neurobiological correlate of such practices is altered regulation of the DMN. The proposed relationship between spirituality, dopaminergic regulation, and DMN activity is summarized in Figure 1.

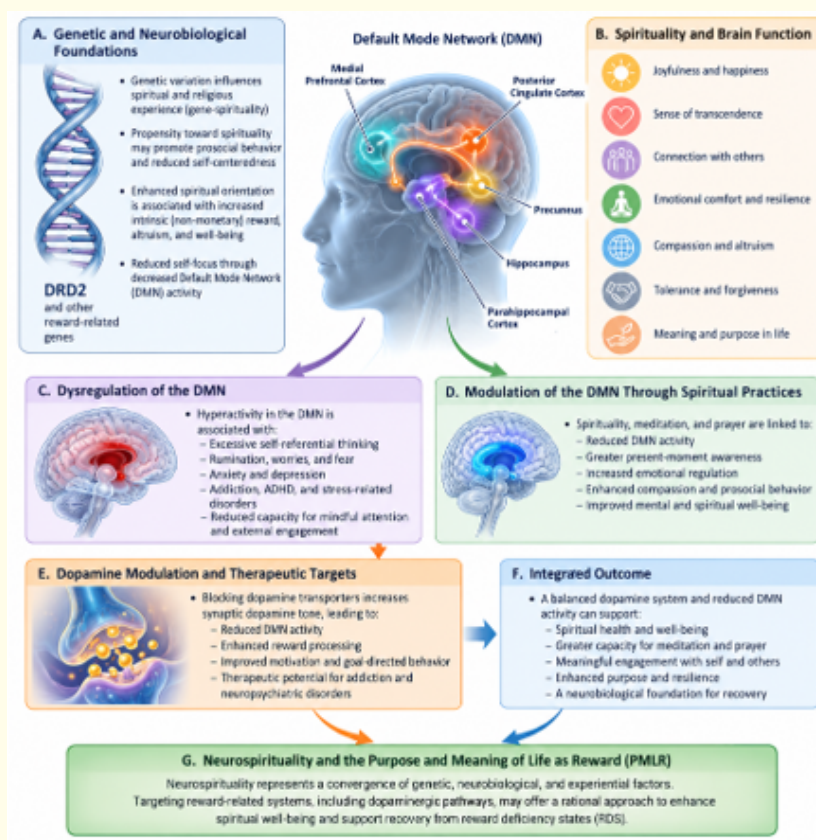


Figure 1: Proposed relationship between spirituality and neurobiology. The figure illustrates the proposed interactions among genetic and neurobiological factors, dopaminergic signaling, Reward Deficiency Syndrome (RDS), default mode network (DMN) activity, spiritual practices, and Purpose and Meaning of Life as Reward (PMLR).

Abnormal patterns of DMN activity have been reported in several psychiatric and behavioral conditions, including attention-deficit/hyperactivity disorder, depression, anxiety, and addiction. Kingsland captured the burdens of self-referential cognition with the observation that humans have evolved into an ape that “takes things personally” [31]. Neuroimaging studies have linked craving and attentional dysfunction to altered network activity [32,33]. Tomasi, *et al.* reported that stimulant-related blockade of the dopamine transporter (DAT), which increases extracellular dopamine, was associated with greater task-related deactivation of the DMN [33]. In parallel, reduced dopaminergic tone within reward circuitry, including the nucleus accumbens and ventral tegmental area, has been discussed in relation to Reward Deficiency Syndrome (RDS) [34,35]. These findings support the broader hypothesis that dopaminergic modulation can influence DMN dynamics, but they do not establish that suppressing DMN activity is sufficient to create spirituality or spiritual health. Whether neurobiological changes of this kind would also foster compassion, tolerance, or love remains an open question.

Contemplative practices provide a nonpharmacologic example of top-down modulation of internally directed brain activity. Meditation has been associated with reduced DMN engagement, particularly during sustained attentional focus [36]. Prayer has also been linked to changes in network activity in studies of religious and contemplative states [35,37-39]. Importantly, these practices are typically embedded within ethical or relational commitments rather than pursued solely as neural exercises. Kindness, honesty, responsibility, altruism, and concern for others are common values across many contemplative and religious traditions, which may help explain why their clinical significance cannot be reduced to a single imaging finding.

Reward Deficiency Syndrome (RDS) has been proposed as a framework for understanding shared vulnerability across substance-related and behavioral addictions, including alcohol and illicit-drug misuse, smoking, gambling, overeating, compulsive sexual behavior, and gaming [23,40]. These conditions impose substantial personal and societal burdens through morbidity, impaired functioning, lost productivity, and, in some settings, criminal-justice consequences. Genetic susceptibility, environmental and epigenetic exposures, compulsive tendencies, and individual behavioral patterns may all contribute to dysregulation of reward circuitry [40]. Although the neurobiology

of addiction has been studied extensively, the translation of these findings into reliable preventive and therapeutic strategies remains incomplete [32]. RDS-related experiences of emptiness, loss of control, or diminished meaning have also been interpreted through a spiritual lens as a longing for integration, freedom, and transformation [41]. Within that framework, Eric R. Braverman described a neuro-spirituality connectome as a component of Purpose and Meaning of Life as Reward (PMLR), suggesting that reward regulation and DMN balance could be explored together rather than as isolated phenomena.

One possibility is that addiction treatment has not fully incorporated the role that spirituality can play for some patients with substance use disorders [42]. If conscious and unconscious experiences, including spiritual experiences, are mediated through brain function, then recovery-related changes in reward processing could plausibly influence how pleasure, pain, meaning, and motivation are experienced [43]. This proposition should be tested empirically and should not be interpreted as evidence that spirituality is reducible to any single neurotransmitter system.

We and other addiction researchers have proposed that the capacity to experience spirituality may vary partly because of interactions between biological predisposition and environmental experience [8]. From this perspective, behaviors and interventions that support dopaminergic regulation have been hypothesized to promote dopamine homeostasis, while future epigenetic or genetic approaches remain speculative [44]. Such ideas are consistent with the broader recovery principle captured by David E. Smith's phrase “Love Needs Care,” associated with the free-clinic movement in San Francisco [45]. Addiction science has repeatedly shown that meaning, connection, and spirituality can be important to some individuals in recovery. Whether future interventions acting between DNA regulation and mRNA expression could safely influence these dimensions remains an unanswered scientific and ethical question.

Policy implications: Supporting recovery, preserving spiritual autonomy

The intersection of addiction neuroscience, inherited vulnerability, and spiritual experience calls for policy that respects both biological evidence and personal dignity. Palmer's nineteenth-century account shows that familial susceptibility

and the possibility of profound recovery have been recognized for generations. Contemporary policy can retain the insight that vulnerability may precede overt addiction while rejecting the older moralizing language historically attached to inebriety. Early risk should justify earlier support, and recovery systems should be designed to strengthen agency, social connection, and personally meaningful goals.

In this context, dopamine homeostasis can be treated as a research hypothesis rather than a settled therapeutic endpoint. Studies should determine whether better regulation of reward circuitry is associated with clinically meaningful improvements in craving, retention in treatment, functioning, quality of life, and long-term recovery. RDS provides one conceptual model for investigating vulnerability and altered reward processing, but neither genetic associations nor DMN measures can establish a person's spiritual capacity or prove treatment efficacy. Independent and reproducible research is needed before genetic testing, nutraceutical strategies, or other reward-focused interventions are adopted routinely or reimbursed as standard care. Investigators should disclose relevant commercial interests, and biological measures should be interpreted alongside outcomes that matter directly to patients.

Recovery systems should also accommodate the diverse ways in which patients define meaning and support. Comprehensive services may include voluntary access to chaplaincy, spiritually integrated counseling, peer-based programs, and explicitly secular alternatives. These options should supplement, not replace, indicated medications and evidence-based behavioral therapies, and they should be offered within a model that gives patients genuine choice among appropriate forms of care [46]. Participation in spiritual or religious activities should never be required for treatment, insurance coverage, or recognition of recovery.

The idea of "geneospirituality" deserves especially cautious treatment. Current association studies do not demonstrate the existence of a remediable spiritual deficiency, nor do they justify genetic intervention to produce belief, altruism, transcendence, or religious experience. Such applications remain speculative and would raise serious questions about informed consent, personal identity, freedom of conscience, and social coercion. Research involving genetics, neurotechnology, or artificial intelligence should therefore protect these domains and should not permit inferred spiritual traits to influence eligibility for care, employment,

insurance, or other opportunities. Belief and nonbelief alike must remain outside any classification of biological defect.

Taken together, these considerations favor a restorative framework in which biological vulnerability leads to earlier opportunity for help rather than to deterministic labeling. Dopamine homeostasis and related reward mechanisms can be investigated rigorously while treatment systems continue to support belonging, agency, and purpose. The key translational question is whether improved reward regulation enables people to participate more effectively in the relationships, practices, and daily activities that sustain recovery. That question can be studied without treating spirituality as synonymous with neurotransmission. Funding should prioritize such evidence, and payment models should allow effective treatment and recovery support to continue long enough for durable change to be assessed.

Accordingly, financing and delivery systems should provide continuity from prevention through treatment and long-term recovery. Clinical care may need to be coordinated with services that address housing instability, social isolation, and family stress when these factors materially affect outcomes. Evaluation should extend beyond short-term symptom change to durable health, function, participation, and patient-defined meaning. This approach creates a measurable policy agenda in which biological investigation and humane care proceed together; new interventions are adopted on the basis of evidence, and each individual retains authority over what recovery and spiritual meaning signify in his or her life.

Conclusion

This editorial brings together proposed links among spirituality, reward-related genetic variation, hypodopaminergic states described within RDS, the mirror-neuron system, and the DMN. It further considers whether selected concepts and practices from addiction medicine could support the neuro-spirituality connectome associated with Purpose and Meaning of Life as Reward (PMLR). Rather than treating any of these relationships as established causal pathways, we suggest that reward regulation, dopamine homeostasis, and DMN dynamics provide testable targets for research on recovery, meaning, and well-being. Future work should distinguish supportive spiritual practices from speculative biological enhancement and should evaluate any genetic, neurotechnological, or AI-based intervention within a framework

that protects autonomy, safety, and freedom of conscience. These proposed interactions among spirituality, dopamine regulation, DMN activity, and neurospirituality are summarized in Figure 2.

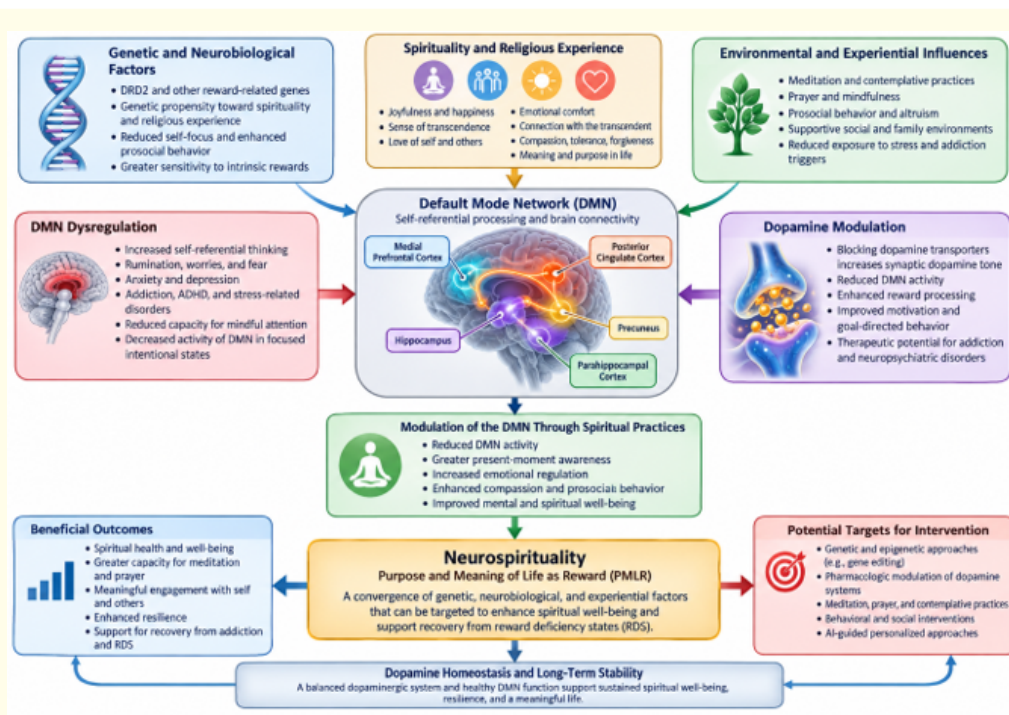


Figure 2: Proposed neurobiological framework linking spirituality, dopamine regulation, and the default mode network.

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Conflict of Interest

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